1859 PUBLISHED WEEKLY 1918

CHEMICAL LIBRARY

MAR 18 1918 UNIV. OF MICH. LIBRARY

AMERICAN GAS ENGINEERING JOURNAL

FORMERLY

AMERICAN GAS LIGHT JOURNAL

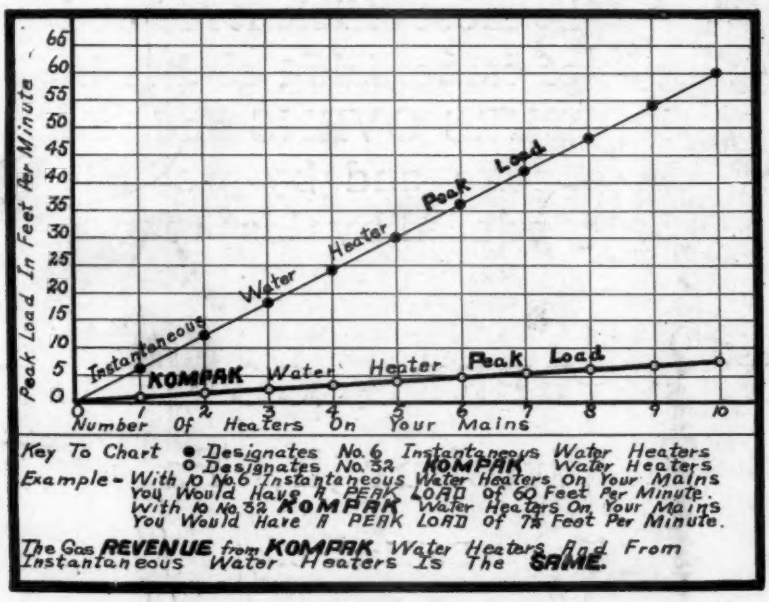
VOL. CVIII., No. 11
WHOLE No. 3132

NEW YORK, SATURDAY, MARCH 16, 1918

Subscription $3 per year
$4 Canada $5 Foreign

REDUCE THAT PEAK LOAD
DEVELOP YOUR OLD MAINS

KOMPAK AUTOMATIC WATER HEATERS REQUIRE ONLY ¾ OF A FOOT OF GAS PER MINUTE



No. 18 KOMPAK

for homes with

1 BATH
2 WASH STANDS
KITCHEN
LAUNDRY

Price $80

ENCOURAGE THE SALE OF

WATER KOMPAK HEATERS

Trade Mark Reg. U. S. Pat. Office

No. 32 KOMPAK

for homes with

2 BATHS
4 WASH STANDS
KITCHEN
LAUNDRY

Price $100

THE LONG-LANDRETH-SCHNEIDER COMPANY
NEW BRUNSWICK, NEW JERSEY

INDEX TO CONTENTS, PAGE 252 ADVERTISERS' INDEX, PAGE 20

KOPPERS

BY-PRODUCT
COKE AND GAS OVENS

The most efficient method of carbonizing coal is in KOPPERS OVENS and the best coke and by-products are produced by this process.

H. KOPPERS COMPANY
Pittsburgh, Pa.

Builders of

By-Product Coke and Gas Plants
Tar Distilling Plants
Ammonia Recovery Plants
Benzol Recovery Plants

AMERICAN
GAS ENGINEERING JOURNAL

FORMERLY THE AMERICAN GAS LIGHT JOURNAL

Vol. CVIII, No. 11 NEW YORK, MARCH 16, 1918 Whole No. 3132

Oxy-City Gas Appliance Provides Tremendous Heat Necessary for the Manufacture of Artificial Gems

Burners Water-Jacketed with Detachable Tips—Can Produce Almost All Known Jewels and Semi-Precious Stones with Exception of Diamonds—No Heat Wasted When Using Gas

By ROBERT E. LIVINGSTON

If man were content to let nature take its course and not try to rival and expedite her methods many beautiful and useful things would be non-existent. If, for instance, the world's supply of emeralds or garnets should be so diminished that everyone was inquiring, "Where do all the old jewels go?" there would be nothing to be done about it. The philosophers would say consolingly, "Just wait a century or so and nature will provide some more." But that is not the human attitude toward nature, and inventions have been evolving

MAKING SYNTHETIC GEMS, USING GAS-HEATED CAULDRONS

INTENSE HEAT REQUIRED IN PROCESS

through all the centuries since Adam first turned clothes designer.

Composition Suggested by Meteor

One of the most recent and fascinating discoveries whereby nature's processes are supplemented is in the jewel kingdom. A century ago the world would have scoffed at the idea that sparkling gems could be made by man, but to-day Dr. Maurice N. Aisen, by the aid of the most exact science and the kindly assistance of gas, is manufacturing in his laboratories synthetic jewels that rival in lustrous beauty those made in nature's long-process laboratories.

Some of the earliest experiments in jewel making were in Dr. Aisen's student days in the University of Paris, and the day that Prof. Henri Moissan, his instructor and world-famed chemist, found diamond crystals on a meteor is one of his glowing memories. The meteor was one which had fallen in Arizona and was shipped immediately to the University of Paris for examination. Out of the discoveries of the pure carbon or diamond crystals that the meteor contained conclusions were formed that it was chiefly a combination of heat and pressure that made jewels.

Dr. Aisen at this point became deeply interested in the gem making and analysis of the component minerals in various jewels followed; then various tests as to applications of heat and pressure. To-day, in his New York laboratories, Dr. Aisen has formulas which produce almost all known jewels and semi-precious stones, the notable exception so far being diamonds. After a gem has been analyzed and its component minerals found, the same proportion of ingredients are assembled and put in crucibles where they are raised to a desired temperature and then are suddenly cooled.

Some Jewels Require Tremendous Heat

Certain jewels require a tremendous heat, and Dr. Aisen has one appliance, especially designed for him by the industrial department of the Consolidated Gas Company of New York, which raises the jewel ingredients up to a temperature of approximately 3,100 deg. Fahr. At this heat a great many synthetic stones can be produced, such as tourmalines, aquarmarines, peridots, garnets, turquoises, etc. While work is still being done on the construction of this appliace, the present arrangement procure the needed temperature and accomplishes the jewel making. At the top of the appliance there is a mechanically agitated hopper with the gas flame (which is oxy-city gas) below, and under that a platform or pedestal. With every hop (after the ingredients are placed in the hopper and it is set in action) a tiny flake or tiny crystal comes down, passes through the temperature holding them at the boiling point until the mass is large enough for a gem. The burners used in this appliance are water-jacketed, with detachable tips, and it is by a scientific combination of city gas and oxygen that the high temperature is developed and sustained.

There are other gas-operated machines used in this beauty-producing industry which work efficiently in small spaces. In fact, Dr. Aisen declares that the small, compact gas appliances are a great advantage in his work, and that by using gas no heat is wasted.

Numerous Methods Developed

Numerous methods have been developed in gem making, according to this French authority, who originated the formulas. By one method aluminum oxide and certain salts, according to the color desired, are fused by an oxy-gas flame which melts the chemicals and crystallizes them. After their crystallization they are cut into gems.

But however simple the story of jewel manufacture may sound when explained to the layman, each prescription has meant years of laboratory experiments, and numerous scientists have devoted their lives to adding to the store of knowledge dealing with jewel production. But the results in colorful, gleaming synthetic stones justify the devotion to the subject. Sapphires, Oriental rubies and emeralds glisten among lapis lazuli and opals, cinnamon garnets and amethysts—all created by the magic or intense gas heat—and perhaps at a not far distant day diamonds will be added, and the list of synthetic jewels will be as complete as nature's own.

How the Gas Companies Are Helping the Nation

Private Arnold Ray, of the commercial department of the Peoples Gas Light & Coke Company, was wounded in action and died on the same day, according to word recently received by his mother. Young Ray saw three years of active war service, having left the gas company in 1915 to enlist in Canada. He was assigned to the 14th Battalion, Royal Montreal Regiment, with which he went to the front. Ray entered the service of the Peoples company as a boy in the bill delivery department, and after several promotions became connected with the commercial department. He was with the company for five years.

New Uses for Industrial Fuel Gas

C. H. Kallstedt Points Out Inclination of Every Prospective Customer to Try to Deduce the Relative Cost of Gas as Compared to Other Fuels by Figuring the Amount of B.t.u. in Each—Asphalt Melting—Manufacture of Lubricants—Chemical Industry—Can Manufacturing—Foundries—Manufacture of Saws Etc.

There is no doubt that any gas man who approaches a manufacturer regarding the use of gas in his plant will find that the first question of interest to the prospective consumer is the cost of gas compared with that of other fuels, C. H. Kallstedt, industrial gas salesman of the Public Service Gas Company of Northern Illinois, will declare in a paper to be presented at the annual meeting of the Illinois Gas Association to be held next week in Chicago. To determine what the rate will be the nature of the products and the method employed during the manufacture thereof, are essential points to the gas engineer. All, or at least as many as possible of the facts, should be given in detail, as even a small error may alter the entire nature of the proposed installation.

First Inclination of Prospective Consumer

The inclination of every prospective consumer is to try and deduce the relative cost of gas as compared with other fuels by figuring the amount of B.t.u. contained in his oil or coal and comparing it with the number found in 1,000 ft. of gas. This, however, is a false basis of comparison, for a great number of other factors must be taken into consideration when comparing with gas (as will be shown in the following paragraphs), of which one of the most important is the question of efficiency.

As an example of the efficiency obtained from gas I will give, as an illustration, a certain manufacturer who had been using coal as a fuel and had operated five separate units all doing the same kind of work under like conditions. Each charge cost the manufacturer $2.58, including labor. With gas as a fuel more work was accomplished, and we found that four units were able to do the work five originally did, at the cost of $2.27 per charge.

The adaptability of gas to many varied uses is another item in its favor. Oxidizing of metals is something that cannot be overcome in an oil-fired furnace. If you try to burn oil with a reducing flame your furnace becomes full of smoke and soot, and so dirty it is impossible to work. This is all done away with if gas is the fuel, therefore any manufacturer who desires a neutral or reducing and a clean flame would be a prospective consumer, easy to convince of the advantages of gas, even if the fuel cost be higher than that of other fuels.

Higher Cost Not Proven

This "higher cost" is, however, not proven, for even disregarding the present high cost of other fuels, the fact that with gas there is no storage space necessary, no demurrage, no freight charge, no inconvenience due to irregular deliveries, no expense for unloading, etc., all tend to equalize the actual costs. For if the charge for the above-mentioned items were added to the cost price of the other fuels as the invoices show, the price of gas would be low.

Besides, in nearly every instance I know of more work is turned out with gas than with any other fuel used previous to the gas installation. However, the price of oil, coke and coal has been so high during the past year that gas at nearly any rate can easily compete with them as fuels.

When gas is to be used in forges and furnaces, a careful survey of the existing conditions must first be made.

Living on the Job

It is true that standard type forges and furnaces have their separate and special uses, but, sometimes, in fact very often, new methods of work are brought forth that require some method of heating seldom or never used elsewhere. Some experimenting is necessary, and one must devote many long hours, in fact, practically "live on the job," so as to determine in what manner the best results can be obtained, and also in order to teach the manufacturer's man the correct method of operating the installation. If this is not carefully explained and taught to the operator, serious blunders will occur and the good will of the consumer will be lost.

In other cases, the manufacturer may have spent large sums of money for installations he has on hand, which he will be unwilling to discard in order to change to gas. Then it becomes necessary to try and change the apparatus on hand with as little cost as possible, so that gas will be burned with economy. This, however, is not always advisable and generally not nearly as efficient as an installation designed for gas. The advantages of gas are so numerous and varied that manufacturers are easily convinced and the number of consumers are daily and rapidly increasing.

New Uses Manifold

The new uses of gas are manifold, due no doubt to its great adaptability. The cost, too, as has been shown, is practically equalized with that of other fuels.

These facts being established, gas is rapidly gaining favor in the industrial field. Factories of all kinds are willing to try it because of the high cost of other fuels, and one success leads to another, for the news of success as well as of failure spreads rapidly. As examples of the new fields into which gas has made recent inroads, I will cite some instances of unusual nature and others which are perhaps the only ones of their kind.

Asphalt Melting

There are without doubt many plants where the heat

treating of asphalt is necessary, and the operation differs according to the class of work produced. Each class of work must necessarily be studied carefully as to the best application of heat so that the most economical installation be used.

The particular plant through which I can best demonstrate the efficiency and economic value of gas as a heating medium is one, an asphalt shingle company, in which an installation of gas about a year ago has proven highly satisfactory. This company is probably the only asphalt shingle and roofing company in the country using artificial gas as their heat medium.

With the prices of wooden and tile shingles high, as at the present time, asphalt shingle and roofing companies are operating day and night to meet the demand put upon them. It is interesting to know that the United States Government, too, has let contracts for thousands of rolls of roofing and squares of shingles to be used at various military cantonments in this country and abroad.

Asphalt necessarily is a very important factor in the manufacture of asphalt shingles and roofing. When oil, coal or coke are used as fuel in the heating of asphalt the combustion chamber or firebox is red hot, and if the operator should be at all careless or negligent and let the temperature rise above 500 deg. Fahr. (flash point), the danger of fire is serious. Consequently, insurance rates are prohibitive and, in fact, 90 per cent of the roofing companies in the country are unable to carry insurance with any reliable company. Steam is often used as a heating agent, but good temperature control is an impossibility.

Gas-Firing Brings Industry Into Insurable Fold

Because of the insurance rates, many of the modern plants are building their heating retorts or tanks a short distance from the plant proper. The method of control with gas, one of the advantages over other fuels, lowers the fire risk, and no doubt was one of the deciding factors with the insurance companies which enabled the asphalt shingle company we serve to place complete insurance with reliable and standard companies at one-fourth the cost previous to the installation of gas.

The felt paper of which the shingle or roofing is made is of various grades and thicknesses. This determines the quality of the finished product. In the several different processes this paper is put through before ready for shipment, three tanks or stills are used. Two are 15 ft. long and 5½ ft. in diameter, and a third 11 ft. long and 4½ ft. in diameter. One of the larger and the small tank are used as saturation stills, while the one other large tank serves as a coating still.

The asphalt in the saturation stills contains fluxes, and a great amount of saturant is necessary with a comparatively small amount of coating, and higher temperatures can be maintained by using two saturation stills.

The paper is first saturated in a tank at a temperature of 400 to 475 deg. Fahr. This nearly burns the paper, but the advantages of the high temperature are that oils contained in the asphalt are broken up at this temperature, while they would not be disturbed at a lower one, and, besides, the felt can be saturated much more quickly. When thoroughly saturated, the paper is coated with asphalt which is at a temperature of from 300 to 400 deg. Fahr., after which the grit, stone or whatever desired is put on.

Under each of the stills, pipe burners are used with special type blast heads so that a maximum of 1,200 cu. ft. per hour is possible. A long baffle plate is placed about 6 to 8 in. above the burner heads and about 6 in. below the bottom of the tank. This tends to distribute the heat and protects the tank from injury. The flues are arranged so that as much of the tank is heated as possible. A small fan, direct-connected to a motor, is used which gives ample air with a very low power charge. It is also advisable that the tanks be cleaned once a week, or at least once every two weeks to remove carbon and other sediment so that the heat becomes as efficient as possible.

Some interesting figures are noted:

Month of October, 1917
Operated Twenty-six Days

492.5 tons of asphalt and fluxes used.
999,775 ft. of gas required.
203 ft. of gas per ton.
400 deg. Fahr. average temperature maintained.
1.023 specific gravity coating.
1.190 specific gravity saturant.

I would say a shingle factory of this type is very desirable for a gas company to have as a consumer. There is a very small variation in load or gas consumption from hour to hour. Some charging is done during the day, but the bulk is done at night. In this manner meter and pipe installation is much smaller than in a factory using the same amount of gas for a shorter period.

For the consumer, too, there are great advantages in using gas as a fuel. Not only does it decrease the fire risk, but it gives greater heat control, accomplishes more work in less time, is labor saving, needs no storage room, does not fluctuate in cost, is more cleanly, and, taking all factors into consideration, is more economical than other fuels.

Manufacture of Lubricants

The product manufactured by one of our consumers is fiber greases, which consists of tallow or paraffin oils as a body, mixed with other ingredients, which latter vary with the different makers. Many difficulties are met with in the manufacture of this product. The grease is boiled nearly to the flash point, 500 to 600 deg. Fahr., so that it will have a high melting point when finished. The higher the melting point the greater the value of the grease.

Grease, unfortunately, has a tendency to boil over when too quickly heated. One of our consumers formerly used oil as fuel. The combustion chamber was made of brick, the grease boiled over, and although the oil had been turned off the red-hot bricks ignited the grease, and a serious fire resulted, with its loss of money and time required to rebuild the installation.

The kettle, as now installed, is heated with a blast burner and a blower supplies the required air. The gas and air cocks are placed quickly accessible to the operator. A charge consists of approximately 2,000 lb., and it takes three hours to complete the cooking, with a total gas consumption of 2,500 cu. ft. Thus a great danger has easily been remedied through perfect heat

(*Continued on page* 259)

How to Sell Gas Lighting

When a Single Mantle Light Averages Five to Seven Thousand Cubic Feet of Output Per Year, and a Gas Arc from Twenty to Twenty-Five Thousand, Chas. A. Luther Wants to Know Why Some Gas Men Should Not Consider Lighting Worth While

Mr. "Gasman-in-General," have you ever taken a pencil and a piece of paper and tried to figure out approximately how near you really come to being 100 per cent efficient? asks Charles A. Luther, illuminating engineer of the Peoples Gas, Light & Coke Company, of Chicago, in a paper he will present at the annual meeting of the Illinois Gas Association at Chicago, March 20.

Have you ever figured out whether the stockholders of your company were paying you for what you know, or what they think you know, or for what you actually do in the way of increasing their business?

From conversations I have had with different "Gasmen" as well as from "talks" I have heard them deliver, I have often wondered what they really thought of themselves, when they had a few "serious moments" alone and were trying to analyze their "income-increasing-business-getting results."

Some of you gentlemen, no doubt, have had these "serious moments." You may even have felt elated over your yearly report that was before you ready to be presented to the president or the board of directors. Perhaps you have contemplated how much salary increase you were going to demand on the strength of your efforts for the past year, or perhaps you were thinking whether it would be advisable to compliment your commercial manager on his business-getting abilities so that he would also have an excuse in asking for an increase in salary.

After building a few air castles, you may have laid aside the recapitulation sheet and started into study out where such a nice increase came from.

Yes, here we have an increase of "?" per cent in our industrial activities and we are going to even show a much larger one for the next year.

Our cooking appliance sales show a fair increase, but we can offer a reasonable excuse for it not being as large as our industrial increase. Oh, never mind, we will make it as large next year and we may even be able to make a little better showing.

Here we have a very odd set of figures on gas lighting that seems to show a percentage decrease over the previous year. What do you know about that? We not only show a decrease in our lighting load, but also show a large increase in the "upkeep" cost of the gas-lighting business that we still have.

Lack of Faith

Now if we could have kept down the "upkeep" cost on the lighting business in proportion to the amount of lighting business we have lost during the past year, we would have shown a larger general net increase.

"I" must get after our general manager (or commercial manager), and have him keep his weather eye on the cost of operating the lighting end of our business and have him push the industrial and food-cooking appliances just a little harder so that our net increase at the end of this year will still show that we can lose more of our lighting load, but at the same time show our stockholders that "I" am still on the job by giving them a larger income in dollars and cents.

And—in most cases, that is, as far as the analysis is carried after those few "serious moments."

Now the question is, why are there so many gas men that take such a pessimistic view of gas lighting in general?

Is it because gas lighting is not efficient, or is it because they feel that gas lights do not use enough gas to make it worth while pushing them?

No, Mr. "Gas Salesman," your guesses are wrong. The reason is that Mr. "Gasman-in-General" believes his product is out of date. His competitor has told him so, so many times that now he actually believes it himself.

He probably had this belief strengthened by some actual happenings in the delivery of his product to the lighting units—happenings that he believed were beyond his control, such as changes in gas quality, pressure and various other complaints. (Never stopping to think of the troubles that the other fellow has to put up with.)

Now, be honest with us, as well as yourself. "Do you believe in gas lighting?" If you do, what have you done to pass this "belief" along, not only to those men who come in under your "generalship," but also to those other gas men with whom you come in contact with every other day or so?

Basis of Prejudice

If you don't believe in it, why don't you? Have you ever talked with a gas man who did believe in it, and if so, did you consider your judgment better than his?

Did you ever come against a real live gas-lighting enthusiast and try to work off some of your pessimistic views on him?

No! The farthest you get along this line was when you were talking with the man working under you. You had on previous occasions propounded your views to him in such a way that he had remembered the stand you took against gas lighting, and no matter what the poor fellow's beliefs were, he apparently fell in your "rut" and to your face assumed the same pessimistic views as you advanced when you told him to lay off of gas lighting, with the idea in mind that it would make him more solid with you.

Now for the sake of an argument let us see what your gas lighting really means to you.

1. Conservatively speaking, a single mantle light will average you an output of between 5,000 and 7,000 cu. ft. of gas per year.

2. A gas arc will average from 20,000 to 25,000 cu. ft. per year.

3. Every single or multiple gas light that is kept up to standard will mean not only a satisfied consumer, but also an advertising medium that cannot be equalled by any other advertising medium in existence.

4. Your arc lighting will give you a chance to derive an income from all classes of stores in your city.

5. Your small lights in apartments and residences will give you an income when their ranges or heating appliances are not in use.

6. Your store, factory, apartment and residence lighting gives you an opportunity to level off your peak loads and approach nearer to the ideal horizontal distribution curve.

7. The most important of all it gives you a chance to show that you believe in your own product.

Suppose that every apartment or residence in your city had one or more mantle lights that were used every day in the year. This added to one or more arc lamps in every store and several arcs in every factory would mean a nice output from this source alone. Mr. "Gasman-in-General," get that pad and pencil out and do a little figuring.

A Determined Attitude

What is that? "How will you go after it?" "Oh!" That is a simple question to answer. First of all, it will depend upon the size of the city you represent. If you come from a small city, I would suggest that you pick out a good live wire among your employees, a man who has some selling ability, call him into your office and broach your subject to him in such a way that it will not startle him, that you have "decided" to go after the gas-lighting business in your city. Give him to understand that you are very desirous of making a record along this line, and for that reason you picked him out from all your employees to reach that end.

Tell him to become thoroughly posted on all the essential things pertaining to good illumination so that he will be thoroughly competent to handle any kind of a lighting proposition. He can first start in to learn all about the light giving and gas consuming abilities of all the different kinds of gas lights you handle, and then tell him to find out all about the other fellow's units, so that he will not be afraid to meet his competitor at any time or at any place—even in his best-lighted jobs.

Offering Encouragement Freely

Keep a close check on him by requesting him to consult and to report to you freely whenever he accomplishes anything of importance. When he reports to you that "Mr. Hardnut" has installed several arc lamps in his place after everybody, including yourself had fallen down, do not treat it as a frivolous matter, but pat him on the back and tell him to go after that other party, "Mr. Crank," the man that you yourself had a run-in with, but could not convince. Then he will get him, too.

Above everything else, give your new lighting expert to understand that he is not to sell anything else but gas lighting, for the best salesmen will take the path of least resistance and sell the easiest thing to sell.

After things begin to come your way in the lighting end, look around and pick out another one of your good ones and place him in the field as an assistant to the first one, and gradually keep on adding men till you honestly and truly feel that you are doing full justice to that end of your business which has been so sadly neglected, *i. e.*, gas lighting.

You, Mr. "Gasman-in-General," who represent a good-sized city, should pick out one of your best men who has had some experience in the handling of men as well as some selling ability and break the news to him gently that you have decided to start a lighting division and that you are going to give him charge of it. This will naturally make him feel good, provided you also inform him that he is going to receive a good salary along with the title as manager of this division.

Developing Initiative

Leave it up to him to pick the kind of men that he wants to help him make a record in this new field. Then tell him to learn all about the lighting business and pass it along to his men so that any one of his men will be thoroughly competent to produce the results as I have enumerated above.

Request him to turn into you every month a detailed report of his department's activities, showing the number and kinds of units sold or rented by every man in his department.

You can pay these men either a straight salary, or a salary plus commission. From time to time, or every month, for that matter, you can pay them a bonus by allowing so much prize money and have it divided in proportion to the number of men you have, pro-rating it so that the man having the best record for the month will receive the highest amount and the next man a little less, and so on down the line.

Now, Mr. "Gasman-in-General," we have here in Chicago a lighting division that has made a record for itself, and as we are not selfish, and have no secrets to cover up that lead to our success, we would be pleased to have you call on us at any time, when we will, individually or collectively, not only convince you that going after gas-lighting business is a game that we all like to play at, but that it is a profitable class of business for the company.

Just to give you some idea what we accomplished here in Chicago for 1917 in gas arc lighting, I will enumerate a few figures that were incorporated in my yearly report:

Net number of arc lamps installed..	19,579
Succession arc lamps signed for.....	12,648
Total arc lamps put in use.....	32,227

Figuring this total number of arc lamps at the rate of 25,000 cu. ft. of gas per year, would give us the approximate amount of 805,675,000 cu. ft. of gas increase per year due to arc lamps alone, not mentioning anything about the increase that was derived from our small residence units that were installed during the year.

Now I mentioned in the first part of my paper that

a good many men are led to believe that gas lighting is out of date because he has heard the other fellow say it so many times.

Now the question is, can a superior quality of light and more economical light be classified by the other fellow as a "has been"?

No, a thousand times no! We are demonstrating every day to those people who have become skeptical about our units (because the other fellow has told them lots of unkindly things about our system), that our method of illumination was so far superior to the other fellow's that he had to invent something new to offset our popularity.

First, it was the hygienic question. Now it is the behind-the-times question, and it is hard to tell what the next question will be.

I say, let the other fellow set the pins up and we will show that we can make a "strike" every time.

If you are in the "spare" class, get up in the "strike" class, learn all about the history and performance of your lighting equipment and then you will be in a position to make the other fellow go back and sit down.

How about your employees? Do they believe that gas lighting is an up-to-date equipment? Do they pass that opinion along to their neighbors? If they don't, then right there is a good chance for you to do some good missionary work. Get some of your satisfied lighting consumers to give you some testimonial letters. Show them to the employees, or, better still, if you cannot convince them yourself, have them make a trip around to a few users of gas lights and let them hear it first-hand.

Right here I want to suggest a field that should be canvassed thoroughly, and that is the insurance field. For reasons unbeknown to us the average insurance man seems to have it in for us in our gas-lighting activities; he never hesitates to slam our gas lighting whenever he gets a chance—for what reasons, he himself does not know.

The Fire Hazard

If he would go back over reports of the National Board of Fire Underwriters as published in *The Weekly Underwriter* of Jan. 13, 1917, he would notice that it states that during the year 1915 there was a loss of $937,714 worth of property due to the careless use of gas, or, in other words, a loss that could have been saved if care had been taken, and listed under partly preventable causes is the losses due to electricity of $11;142,559, and, mind you, they admit that it was "partly" preventable.

For the State of Illinois they show nearly as much loss from electricity as they do for gas all over the United States.

Now the question is, why are they down on gas? Let us find out and try and educate them to use amber glasses rather than red glasses, when they are telling what they know about gas.

I could continue talking on this subject for some time, but I think we have enough solid meat in what I have written, and as the meeting this year will not warrant a lengthy paper, I will bring my questionaire to a close by asking you how many of you have as yet figured out whether you are 100 per cent efficient?

Illinois Standards for Gas Service

F. D. Fletcher Records His Interpretation of the Rules and Standards Under Which the Companies in that State Work

It is generally admitted that State control of public utility service conditions has many advantages over such control as exercised by municipalities. On account of its larger resources and powers the State is better able to gather the information necessary for enacting and enforcing the most suitable forms of requirements, and is better able to carry on efficient inspectional work, Freeman D. Fletcher, assistant engineer of the State Utilities Commission of Illinois, will declare in a paper to be presented before the annual convention of the Illinois Gas Association at Chicago, March 20. Men of varied experience can be employed, there is less liability of unreasonableness in the requirements, and the various decisions are less apt to be biased. Furthermore, city inspection is not always practicable because of its cost. In case there is non-compliance with the rules or orders, the enforcement proceedings involved certainly carry more weight when being pressed by the State. There has been some criticism concerning the fact that State rules must apply to all companies, large or small, and it is perhaps true that the small company does find it more difficult and expensive to meet these requirements, but then, too, their rates for the service are different. The Illinois commission has on several occasions taken such matters as this into consideration and has granted exemption from those rules which would have caused the small company difficulty if enforced.

To insure satisfactory service from a gas company, gas of a good and reasonably uniform quality must be distributed at satisfactory pressure, correctly metered to each consumer. The service rules of the Illinois commission clearly define the above conditions, and, in addition, are sufficiently comprehensive to cover other points on which questions might arise. It is absolutely necessary that certain records be kept if there is to be any definite basis on which to judge the service and to assure the public that everything is as it should be.

Patrons, operators and commission inspectors often have varying opinions as to the standard and adequacy of the service rendered or required under the rules. This is a matter of dispute which cannot always be amicably settled, and in the following discussion the writer has endeavored to point out what is expected of the company, and the reasons therefor. There is no desire to argue, and it must be understood that the views expressed are not necessarily those of the commission.

Records and Reports

This rule states the length of time the required records shall be preserved, and specifies where such records shall be kept. No further explanations appear necessary. The most frequent infraction is failure to preserve B.t.u. data in a proper manner.

Testing Facilities

It is necessary to provide a laboratory, meter testing equipment, etc., if a company is to meet the requirements of good service mentioned above. Not only

should such equipment be available, but it must be used. A number of companies make only those tests required and at those intervals specified by the commission, while others, realizing the benefit to be gained by such tests, make much greater use of their testing apparatus. The condition of the meter shops and laboratory, and the uses to which they are put, is generally a good criterion not only of the attitude of the management toward the commission and the public, but also of efficiency.

Request Tests

It would seem that every company should be willing and anxious to make request tests promptly and without charge, in order to reassure the complainant and dispel the idea that the company is unfair and has intentionally set a fast meter. Only one or two actual infractions of this rule have been found, *i. e.*, where a charge was made for making such a test; but very often, when the meter tests O. K., the matter is dropped and the consumer is not notified simply because he has not made a written request. A letter or statement setting forth what has been done requires but a few minutes' time, and undoubtedly does much towards satisfying the complainant. To provide against "chronic kickers" and "cranks" the six months' provision has been inserted.

Adjustment of Bills for Meter Error

Under this rule it is necessary that refunds be made in case meters are found over 2 per cent fast on any test. Many violations of the rule have been found. In some cases the company does not rebate on all tests; in other instances the refund extends over a period of only three months. The excuses met with are many; the refund is small and the trouble involved costs the company more than the refund itself; such a refund causes a flood of request tests from other parties who have heard of the result, and one utility man even advanced the opinion that "What the consumer doesn't know won't hurt him." It is only just and equitable, however, that the consumer receive his rebate, and although some inconvenience may result to the company, the benefit gained through an improved opinion of the company's honesty should overbalance the detriments. Generally there is nothing to indicate when the meter began to register incorrectly, and it was therefore necessary when framing this rule to choose an arbitrary period over which the rebate must be made. Six months, or for the time the meter is installed, not exceeding six months, seemed reasonable, and was adopted. The rule should work both ways, and there is no reason why a consumer should not be obliged to pay for the gas which he has used, but which has not been registered owing to some defect of the meter for which the utility is not responsible. The matter of collecting on slow meters is a matter of policy which is up to the company to pass upon. On account of the ill-feeling which is almost certain to arise from such a practice, most of the utilities in the State are not making such an attempt. Just when the company would be considered at fault is not specifically stated in the rule, but the fact that a meter has been allowed to remain in service for more than five years, or if it be more than one per cent slow when set, would seem to come under this heading.

Records of Test and of Meters

In order to preclude as far as possible the chance of false reports, and in order that results may be checked, it is required that complete information concerning each test shall be kept on file. It is desirable that the original data sheet be preserved and not merely a copy.

The form of meter records necessary to meet the requirements of the commission has been a source of considerable trouble. It was early decided to leave to the companies the particular way in which the records should be kept; the requirements of such records are clearly expressed in the rule, and no trouble should be experienced in designing satisfactory forms. It is advisable, of course, to submit to the service division for approval a proof of any such proposed new forms, and in that way avoid any misunderstanding with the various inspectors. The service division has a number of sample forms on hand and is always ready to render any assistance possible along these lines.

In order to save expense and to secure uniformity, it is advisable for the various companies operating in more than one city in the State to have uniform records. In some cases this has been done, but the practice is not nearly as general as it should be.

This rule further provides for the monthly and annual tabulation of all meter tests, and it is surprising how few operators realize the importance of the data thus made available. One company which was making only the required number of periodic tests immediately "speeded up" when their tabulations showed that only 32 per cent of the meters which had been in service more than five years were within the 2 per cent limit, and that more than 45 per cent were more than 2 per cent slow, while but 12 per cent of such meters tested O. K. A number of the forms now used in making up such summaries are very unsatisfactory, but in view of the attitude the companies have taken in such matters, a change has not been insisted upon. The most satisfactory form is that outlined subsequently under the rule on periodic meter tests.

Meter Readings on Bills

Several unsatisfactory bill forms have been found. The amount of the bill should be readily computed from the information appearing thereon. The dates of the meter readings are essential and very often forestall a complaint regarding a high bill. Also, where gas and electric accounts are rendered on the same bill, the discount for prompt payment on each service should be distinctly shown. In case the form of the bill is changed for any reason, it would be well to bear in mind the requirements of this rule in designing the new forms.

Although the majority of the companies pay prompt attention to complaints from their consumers, the complaint records are often found to be very incomplete. In order to meet the requirements of this rule the record should show the name and address of the complainant, the date and hour on which the complaint was made, the nature of the complaint as received, the trouble found, the remedy applied, the date and hour on which the matter was investigated, and the name of the employee who handled the matter. Many companies fail to note enough detail as to the trouble found and the remedy applied. A complaint of "poor gas" marked "O. K." is not sufficient to tell the real nature

of the trouble, and makes it impossible to analyze the complaints with a view of obtaining an idea what actually is wrong with the service. If the essential information given above is noted on each complaint, the form in which it is kept will not be of great importance. One or two of the large companies classify all complaints received according to date, district and nature, but the general practice is merely to file by date.

In the case of written complaints an acknowledgment should of course be made, and the complete file kept separately from the oral complaints. It is also well to keep a separate file for all high bill complaints which have necessitated a special investigation. This file should contain the data collected during the investigation and should clearly indicate the final disposition of the matter.

Regarding the nature of the service complaints which come to the attention of the commission, the following information may be of interest: During the past year 315 informal complaints were investigated by the service division 80 of these complaints, or 25.4 per cent, had to do with gas service, and were divided as follows:

High bills	42
Service extensions	26
Poor service	10
Miscellaneous	2

Experience would seem to show that more general use of a complaint meter might well be made for convincing doubtful consumers that they are really burning the quantity of gas for which they are billed.

Interruptions of Service

This rule is seldom, if ever, violated. Continuity of service seems to be a matter of pride with all gas men, and it is surprising to know of the efforts put forth to keep the holder up. When the trouble lies in the distribution system there is apt to be more delay and the efforts to remedy the matter are not always all that they should be.

Definition of a Cubic Foot of Gas

This rule is a definition only, and detailed comment appears to be unnecessary. It is surprising, however, to know that several companies, and not particularly small ones either, do not correct their send-out to the standard conditions of 60 deg. Fahr. and 30 in. of mercury. This is, perhaps, one reason why operating statistics are not always comparable and are often very misleading.

The volume of gas is directly proportional to the temperature; therefore a meter located close to some source of heat does not deliver the same number of B.t.u. for $1 as does a meter located where normal conditions prevail. For this reason the rule provides that a meter in service shall not be subjected to a temperature exceeding 75 deg. Fahr. Only one violation of this part of the rule has been found during the past year, and in that particular case the company was required to make suitable rebate.

Meter Testing Equipment

It is necessary that every utility shall own an approved meter prover and maintain the same in proper adjustment to register the accuracy of the meters to within ½ per cent. Compared to the rotating standard used for testing electric meters, the prover is a simple piece of mechanism. However, in order to obtain accurate results it is necessary that the apparatus be so located as to be free from drafts and excessive temperature variations, and that it be equipped with suitable thermometers and other accessories.

On account of the press of other work brought about by war conditions, but very few provers have been tested by the service division during the past year. However, each inspector is supposed to give the prover very careful attention at the time routine inspections are made. If the thermometers check, if the location is satisfactory, if the accessories, such as valves and hose do not leak, there is not much chance that the prover is in error to any very great extent. Then, too, the general appearance of the prover is generally a good criterion of the care given to the matter of obtaining accurate tests.

Gas Meter Accuracy

The proper metering of the gas as delivered to the consumer is a most important function of the gas company. The essentials of a good system of commercial metering are as follows: Assignment of the proper type and capacity of meter to the individual installation; a proper system of tests before installation; proper installation and location, and regular periodic tests. If this rule, together with the following rule, is carefully observed, practically all of these requirements will be met.

The method of testing is not yet standardized among the various companies, although the rule very clearly states what is required by the commission. First, at least two runs shall be made on each meter, the results of which shall agree within ½ per cent. Although the rule does not state the fact clearly, it has always been held that only the results on the "closed" test shall be considered as official, *i. e.*, when the meter is passing gas at the rate of 6 cu. ft. per hour per rated light capacity. With the usual test caps a pressure of 1½ in. should be carried on the prover to give this rate of flow. The practice of testing meters at service pressure does not always give a test at the required rate. Although no mention is made in the rules of an open test, such a test is certainly useful, and before being placed in service the meter should be adjusted to be not more than 1 per cent in error both on open and closed tests. After the final test each meter should be plainly marked with the date on which the test was made, and although not required, it is advisable to also mark the degree of accuracy.

Upon removal from service the meters should be capped at once, stored near the prover, and tested as soon as temperature conditions are normal. The boast of one manager that he had the meter out and tested within an hour after a certain complaint was made was rather ill-timed, and shows how little attention is sometimes given the matter of accurate tests.

The latter part of this rule has sometimes been interpreted to cover those cases of prepayment meters geared or set so as to cause a rate or amount higher than would be paid if a standard prepay meter was in use. Such meters are generally set only after permission has been granted by the consumer. Thus people

who would be deprived of the service on account of not paying past bills are offered an opportunity not only of receiving the service, but also of paying up for past service without hardship. The companies believe this method to be as beneficial to the consumer as it is to them. However, the company is at fault for allowing such bills to accumulate, and there is always the possibility of mistakes being made resulting in the "loss" of the meter, or in leaving it in service too long. The practice of allowing such a meter to be used could easily be abused, and merchandise bills, etc., collected via the meter, which is, of course, not permissible. The policy of the commission relative to rates for gas sold through prepayment meters has been fully set forth in a number of formal orders, and will not be detailed here. In almost every case a rate higher than that for credit meters has been allowed.

Periodic Meter Tests

A large number of companies are lagging behind in the matter of periodic tests. The longer meters are in service the slower they become.

Slow meters mean a loss of revenue and the company is certain to find it to their advantage to make the tests with the frequency prescribed by the commission.

Referee Tests

The average consumer generally is of the opinion that all gas meters are more or less fast, but at the same time he is not willing to risk $2 on a referee test. During 1917 but one referee test of a gas meter was made by the commission's inspectors. The meter in question was found 2 per cent slow.

It is the general practice in making referee tests to make the test in the town where the meter is located, using the company's power, provided it is in satisfactory condition. If the consumer objects to this procedure, the meter, after the test on the company's prover, is carried by hand to Springfield and a check test made on a certified prover.

Calorimeter Equipment

Each utility having a send-out of more than 20,000,000 cu. ft. per year is required to have a calorimeter of a type approved by the commission. It has generally been found that calorimeters of the flow type give the best results and are most dependable and economical in operation. The commission requires that tests shall be made on at least three days each week, but this is a minimum requirement, and it is advisable to make tests every day. Some companies are not getting the proper help from their calorimeter, and many consider it as a necessary evil. In a well managed and efficiently operated plant the calorimeter is considered indispensable, and is used as a guide for operation. Frequent tests are made each day, and relative to quality nothing is left to guesswork. To the coal gas operator the number of B.t.u. obtained per pound of coal carbonized is just as important as the yield, and with the varying quality of gas oil at the present time the calorimeter certainly offers to the water gas man a means of ascertaining how many gallons per thousand it is possible to save and yet maintain the proper standard.

Some of the faults most often noted by the inspectors are poor set-up, *i. e.*, the calorimeter is not located in a position free from draft and from extremes of temperature; the means for providing inlet water at room temperature is of insufficient capacity; lack of care is used in calculating the results; the original data is not saved; more than one determination is not made, or tests made within a few minutes of each other do not agree within 1 per cent. All the above requirements are in accordance with standard practice and must be observed if accurate results are to be obtained.

Heating Value

One of the most important requirements for good gas service is uniform quality. Gas is being used more and more for cooking and heating, and with industrial appliances where the heat value is of supreme importance. Even in modern lighting the light does not come from the illuminating qualities of the gas, but from a mantle brought to incandescence by heat. Therefore it is now generally recognized that the heat unit standard is the proper basis for quality requirements. Through the introduction of the heat unit standard it has become possible to regulate this phase of the service within fairly close limits. In the matter of precision in determination, the heating value is superior to candle-power and requires less skillful operation of test apparatus without experiencing great loss of accuracy.

All State commissions which have issued rules regulating the quality of gas have included a calorific requirement and have made no mention of candle-power. The fixing of the heating value standard in the past has been more or less arbitrary, *i. e.*, the figure chosen represented the requirements elsewhere, or perhaps it was average quality assumed to have been delivered by the companies previous to the time of regulation. The Illinois standard was carefully calculated and finally selected with the idea of having a standard which would be suitable and fair to both consumer and company. The correct basis for such a standard is the delivery of the most heat to the consumer for $1. The requirements will, of course, vary in the different States, but with conditions such as they are in Illinois a monthly average total heating value of not less than 565 B.t.u. was considered reasonable. The total heating value is specified, as that value is the most fair unit of usefulness of the gas as it is supplied to the consumer. It is also the basis on which practically all other fuels are rated. It is interesting to note that actual tests made with ordinary domestic appliances and under conditions met with in the routine use of such appliances show that gas having a heating value of 565 B.t.u. gives greater efficiency and better results than does a much richer gas. Too rich a gas is not desirable, as it tends to produce difficulties in distribution and is more or less unstable. A gas of medium quality gives greater efficiency because it permits of greater ease of regulation and does not vary to any appreciable extent as a result of ordinary climatic changes.

Even the best operated of gas works cannot send out an exactly uniform product. The average heating value for each month, together with a suitable minimum limit, was therefore used as a basis. This relieves the company from responsibility in cases due to unforeseen conditions, and allows reasonable time to overcome irregularities. However, it should be remembered that gas which varies least from day to day gives the most

satisfactory service, and every effort should be made to send out as uniform a product as possible. Frequent use of the calorimeter is a great aid in this respect.

An allowance of 35 B.t.u. per cubic foot in the monthly average has been made for the loss of calorific value from high pressure and long distance distribution. Recent experiments made under the direction of Charles D. Jenkins, inspector of gas for the Board of Gas and Electric Light Commissioners of the Commonwealth of Massachusetts, show this allowance to be reasonable.

The rule also provides that no utility shall lower its present standard without first obtaining in writing the consent of the commission.

Purity of Gas

It would hardly seem necessary that the State or city should regulate the quantities of impurities which should be allowed to remain in the finished gas. Those impurities which are most obnoxious to the consumer are the sulphur compounds and ammonia. It is to the interest of the company to remove all the ammonia possible because of its corrosive action on certain metal parts of the meters and on account of its marketable value. Practically all the companies in the State are progressive enough to realize these facts, and therefore no mention of ammonia was made in the rule. Carbon dioxide, nitrogen and oxygen are undesirable on account of their effect upon the heating value and candle-power, and result in more or less inconvenience and loss to the consumers, but it has not been found practicable to limit their percentage in the gas.

As in practically all other States, the Illinois limit on total sulphur is 30 grains per 100 cu. ft. The amount of total sulphur depends somewhat on the method of operation at the works, but mostly on the character of the coal or oil used. This limitation therefore really affects the quality of the fuel that may be purchased, and for this reason must not be unduly severe. However, on account of the objectionable products of combustion, *i. e.*, sulphur dioxide and sulphuric acid, the public has the right to expect the lowest quantity practicable. The companies manufacturing water gas have no difficulty in maintaining a low sulphur content, the average in Illinois being less than 10 grains per 100 cu. ft. The allowance of 30 grains per 100 cu. ft. permits the use of certain high sulphur coals, and in only one or two instances has a company passed beyond the limit. In those cases the commission was as lenient as possible, and only asked that a conscientious effort be made to send out a better gas.

It was thought best to fix a definite limit on the amount of hydrogen sulphide which should be allowed in the gas, and it was decided that 1 grain per 100 cu. ft. would be reasonable. A fixed numerical value is somewhat undesirable, for the reason that an accurate determination is a more or less difficult and lengthy process and would only be practicable in a large works where a chemist is employed. The test with the lead acetate paper when carefully made has a quantitative significance, and if the gas passes this test in a satisfactory manner, there really is no difference as far as the consumer is concerned between the 1 grain of hydrogen sulphide as limited and that actually present. In order to prevent error and to set a standard method, the proper procedure was outlined in the rule.

A daily test for hydrogen sulphide is essential, and as the whole operation requires less than five minutes, its frequency works no hardship. The test papers should be preserved in a room free from the foul gas, or they will turn black with age, and upon inspection there is apt to be some controversy as to whether the hydrogen sulphide content has been as great as the papers show.

For purpose of inspection the proper place to test for hydrogen sulphide is at the outlet of the holder. However, in order to make certain that the gas is being properly purified, and in order to detect the trouble before the holder becomes filled with foul gas, frequent tests should be made at the purifiers. The frequent use of a Tutweiler is also strongly recommended.

Pressure of Gas

A great many complaints of poor service are the result of poor pressure. That the pressure be a fixed amount at any one point is not always essential, but it is necessary that the changes do not vary over too wide a range. Therefore there are three values specified, *i. e.*, the maximum, the minimum and the allowable variation.

On account of the increasing amount of gas which is being used, and the high cost of main material, the tendency at present is towards higher pressures, thus making use of mains of otherwise insufficient capacity. However, this tendency towards higher pressures can be carried too far; not only may the increase in leakage become serious, but the ordinary burners for both stoves and lights are designed for pressures not exceeding 8 in. If a higher pressure is used, readjustment and replacement are necessary. It might be well to note, too, that for every increase of 4 in. of water pressure at the meter inlet the meter runs 1 per cent slower, and the company's revenue is decreased by that amount. However, without careful adjustment of the appliances, the increased pressure would result in waste at the burner and the consumer's bills would be more than usual.

As the company's patrons use the term, "poor gas" is synonymous with poor pressure. The consumer has the right to expect a pressure which, with reasonable house-piping, is sufficient to operate the appliance conveniently and efficiently, and it is generally true that reasonable satisfaction with lights and stoves can only be obtained with pressures of 2 in. or greater. This minimum is not intended to guard against dangerously low pressures, although it does do this, but rather provides for the efficient operation of the various appliances.

More important than either the maximum or minimum pressure is the variation in pressure. If a consumer's appliance is set for some particular pressure, it will not operate satisfactorily nor efficiently at a pressure much different from this value. Without a good pressure regulation, good service is impossible. It has been found that a variation of 100 per cent of the minimum is reasonable and results in satisfactory service without undue hardship on the company. The variation is limited on the basis of one day, because the conditions of the distribution system on days of peak loads determine the severity of the limitations.

It is specified that the pressure shall be measured at the outlet of the meter. The company is thus relieved from penalty on account of inadequate house-piping

(*Continued on page* 254)

AMERICAN GAS ENGINEERING JOURNAL

FIFTY-NINTH YEAR

Published Weekly by
AMERICAN GAS LIGHT JOURNAL, INC.
42 Pine Street, New York, N. Y.

ELBERT P. CALLENDER, *President*
STANTON G. KRAKE, *Vice-President*
FREDERICK A. SOUTHWORTH, *Secy-Treas.*

EUGENE C. MILES, *Editor*

Subscription $3.00 per year, including postage in the United States, Mexico, Cuba, Porto Rico, Hawaii or the Philippines.
In Canada, $4.00 Foreign, $5.00
Single Copies, 10 Cents.

WESTERN MANAGER
E. B. FRITZ

CHICAGO OFFICE
537 So. Dearborn St.

Entered at the Post Office, New York City, as Second Class Matter.

CONTENTS

OXY-CITY GAS APPLIANCE PROVIDES TREMENDOUS HEAT NECESSARY FOR THE MANUFACTURE OF ARTIFICIAL GEMS. BY ROBERT E. LIVINGSTON 241

HOW THE GAS COMPANIES ARE HELPING THE NATION 242

NEW USES FOR INDUSTRIAL FUEL GAS..... 243

HOW TO SELL GAS LIGHTING..... 245

ILLINOIS STANDARDS FOR GAS SERVICE..... 247

EDITORIALS 252

MERCHANDISING GAS 255

THE PREPARATION OF GAS COMPANY PUBLICITY.. 255

NEWS OF THE GAS INDUSTRY..... 263

PERSONAL NOTES..... 264

CONSTRUCTION NOTES—PAGE 15 OF ADVERTISING SECTION

A Topsy Turvy Situation

We assume that gas companies in general are still interested in the education of their employees.

We are not too confident of it, however. We know that they were a year ago, but then they were also almost frenziedly interested in merchandising at that time. Then, when merchandising became vastly easier, and at the most propitious time, to increase loads many companies became just as vitally interested in keeping them down. No logical reason for this attitude has ever been advanced. Nevertheless it became quite general.

The gas company should be more interested to-day in making each of its employees a better employee than ever before. But gas companies and electric companies, we have discovered in the case of merchandising, do not always follow the logical course.

We will assume they are interested. It therefore becomes our duty to inform them that, in general, they are not making much progress. The reason is a state of uncertainty in the employee's mind as to what the future holds in store for him, if there is any future.

The primary source of uncertainty lies in whether the next few months will not find him in the service of the nation. He should be shown that, whether he is or not, what he has learned about gas in the meantime, or selling it, will not do him any harm, and, in case he does not enter the service, or comes back to the gas industry from it, it may have a considerable value to him.

Another source of uncertainty is in the event that he does not enter the national service, is he sure of his position in the gas business?

In view of all we have heard, this seems a curious statement. It is true nevertheless.

The employee is not in the intimate confidence of those higher up. He merely sees that his customary tasks are being eliminated, and he cannot see any further need of his services in the company. Perhaps the management has some other niche in which it expects to place him, but it has not confided these intentions to him.

As a consequence, this employee does not feel very much interested in bettering his knowledge in his particular line.

The question of "What's the use?" enters largely into his calculations.

Also, many gas company employees who, under the spur of promises as to the future, studied diligently to broaden their knowledge, have recently seen the possibilities held out before them fade away almost over night, and to their present outlook there is no chance of ever utilizing the education they have so laboriously gained.

There can be no doubt that a very large number of gas company employees have lost all interest in bettering themselves educationally.

The gas industry should take this thought into careful consideration. How much this marking time in the way of education in gas industry will delay development and progress it would be difficult to estimate. That it will have its effect, there can be no doubt.

It is a very important problem and should be dealt with promptly.

The Tortoise and the Hare

Some of us, flushed with success in displacing electricity in favor of gas for lighting in show places and other similar adventures, had begun to take ourselves real seriously, and to gauge our alertness on the basis of known accomplishments rather than upon the opinions of others. We had forgotten, despite the fact that we were continually being informed, that contrasted to the electric man we are as the tortoise to the hare. The following quotation from the *Electrical World* for Feb. 9 comes therefore as a shock, and naturally prompts the question, "Who's sleeping now?"

> "Housing of the army of workers necessary at shipyards and other places engaged in war work is one of the serious problems confronting the Government. In the model communities already erected all the homes have been equipped with electricity, not because of any special urging by the electrical industry, but because designers feel that electricity is the proper thing. Some day, however, the gas companies *may show enterprise* and these new communities and cities may be won over to the use of gas for illuminating, heating and cooking purposes. It is not wise, therefore, for the central-station industry to take anything for granted. *The tortoise has been known to outrun the hare.*"

If we were "German" competitors we would take no notice of those observations. The electrical man has become hypnotized with the idea that he is the last word in "ginger," "pep," "push," alertness, or whatever else he chooses to style it. To him the gas man is so entirely outside the pale of possibility that he deigns to accord him no thought, except now and then when he desires to cite a horrible example of mental and commercial sluggishness. As a consequence he has permitted the gas man to come in and take away from him a good portion of his business that a portion of combativeness might have saved.

But we want the gas man to compete strictly on the basis of the merits of the respective products. He can sell enough gas on this basis alone to double our present manufacturing capacity. We would not want him to capitalize his competitor's self-delusion. There is no need.

We note that the *Electrical World* is under the impression that such homes as have been equipped with electricity are the sales product of the feeling on the part of the designer that electricity is the proper thing rather than of the sales efforts of the electric companies. The impression is conveyed that these designers feel that electricity is the proper thing not only for lighting, but for *heating and cooking.*

If this is true, then it is past time when the Government should be looking around for some new designers who are equipped with a slightly better general education.

These are economic times. Conservation is the word we most frequently encounter. Electric heating and cooking doubtless have their places—on railroad trains, for instance—but those places are nowhere where manufactured or natural gas is available.

They are uneconomical, and wasteful either in money or resources, and waste is now morally, if not legally, a crime. They are wasteful not only on a primary fuel basis, but they are wasteful in the country's toluol resources.

For the *Electrical World's* better information, we might add that the unlikely contingency it foresees in its Feb. 9 editorial that, "Some day, however, the gas companies *may show enterprise,*" had actually arisen in the particular case it has in mind some weeks, or perhaps months, before its warning to the central stations appeared. Gas interests have already submitted estimates on gas heating and cooking installations in compliance with the request of some of those designers of Government workers' housings.

Ordering Next Winter's Heaters in the Spring

We do not know all the underlying reasons for some companies falling down in the house-heating end this winter, but we do know one reason why the company which came through the test in the most spectacular manner of all was able to meet all demands when heater sales mounted to more than a thousand a day. It ordered early; in fact, had placed its orders in the spring.

The coming winter will offer an opportunity without parallel to the gas industry; an opportunity not only to merchandise heating appliances to an extent that will shatter all precedent, but to a very broad and comprehensive extent to relieve human suffering and to sustain the morale of the people of the nation.

No gas man who cherishes the repute of the gas industry, who values even approximately the good will it has gained during all the years that are past, will leave one stone unturned that may enable it to adequately and generally live up to its responsibilities in the house-heating end.

There are other factors involved in its ability to do so beyond an adequate supply of heaters. However abundantly we may provide these, they can serve no purpose unless there is gas to burn in them. The factors of coal supply and manufacturing capacity are

of equal or greater importance than the matter of appliances.

But every day the nation is getting more and more into its stride. There will be greater discrimination shown next year in priorities in coal shipments. It is probable that all gas companies will be better provided for next winter than has been the case this winter.

The matter of manufacturing capacity is more serious. There is a certain degree of elasticity, however, in this particular, though in the cases of some companies the elastic limit has been gravely exceeded. Still periods of excessively cold weather do not ordinarily durate for long continuous periods, and much is possible by working at full draft. And another matter that has apparently not received the consideration its importance justifies has a bearing on this problem.

Some of those companies which curtailed on heater sales, hoping thereby to lessen the demand for gas, in reality achieved the reverse. Department stores sold as many heaters as they withheld, and they were probably less efficient. And no one was going to freeze simply because he did not have a means at hand to burn gas efficiently so long as he had gas. The cooking range was not designed as a house heater, but it is certain it was made to serve that purpose in very many homes throughout this broad land. It is indeed possible that had there been many thousands of additional gas heaters in use throughout the country this winter there would have been a materially lessened demand upon the capacities of our plants.

It will be a disgrace and a misfortune next winter for any gas company to be unable to help out to the limit the demand in the house-heating end, solely for want of heating appliances. Inability to do so because of coal shortage or plant capacity may be excusable. But an inability to supply the means of utilizing the gas, never.

There is ample time to make sure that the appliances will be available. Ordering in the spring will give the manufacturer an opportunity to discount materials delays, and for the railroads, despite congestion, to move the raw materials to the manufacturer and the finished product to the gas company.

Illinois Standards for Gas Service

(*Continued from page* 251)

beyond its control, and at the same time does not limit the pressure carried in the mains.

A number of infractions of this rule have been found. In general, the commission has allowed the company to choose its own method of improvement. Some have increased the holder pressure, others have installed a booster system of high-pressure belt lines with district governors, and some have laid larger low-pressure mains. In every case a reasonable allowance of time has been granted to make the alterations. It has been advisable in one or two cases to outline the work which should be done, but only with the unqualified consent of the company and because engineering advice was asked.

The second part of this rule provides for pressure surveys and it is surprising to know what little use is made of portable recording gauges. A thorough pressure survey is an effective and certain means for ascertaining the true pressure conditions, and the results, if properly acted upon, will forestall complaints which sooner or later are bound to come. It is expected that enough charts be taken every month to show clearly the pressure conditions on all parts of the distribution system.

Record of Interruptions

As has been explained above, complete interruptions of gas service are quite unusual, and it is probably for this reason that very often there is a lack of records concerning such matters. However, in many cases the pressure charts taken at the works on the send-out gas, or at the office, show very unusual conditions, which, although not a technical interruption, must certainly affect the service. It sometimes happens that upon inquiry no one can remember for certain just what took place on that particular day to drop the pressure, and the information concerning the matter which can be obtained by the inspectors is very meager. It is a good plan to note on the back of such charts the causes of any unusual occurrence affecting the pressure as recorded. This will answer the requirements of the rule in every respect.

Extension of Mains

This rule has apparently met the requirements of both consumer and company. The complaints concerning main extensions which have come to the commission have had to do with the proper size of main to be laid, to the cost, or to delay in completing the work, all of which are matters which cannot be covered by a definite rule.

Individual Citizen Directly Concerned in the Financing of Public Utilities

Frank M. Huston, financial writer for the Chicago *Herald,* in the issue of March 4, asserts:

"This problem of financing utility corporations is not only a public one; it reaches down to the individual more directly than does the railroad situation for the reason that the utility corporations to a large extent are local in their operation. Hence a most urgent and pressing peril is forced upon the attention of the individual, especially in the cities, by the obvious fact that all citizens are dependent so largely upon the efficiency and strength of these corporations to supply light, fuel and transportation. The individual is interested in the railroads because the railroads transport foodstuffs and supplies and coal for their own use and to keep industries moving. Failure of a utility corporation to perform the service for which it is organized adequate to the requirements deprives the individual as well as industries of light, fuel and transportation.

First Year's Output of St. Paul Company Now Half Day's Supply

In the summer of 1857 the St. Paul (Minn.) Gas Light Company broke ground for the erection of the local gas plant and in the spring of the following year the first gas was supplied to St. Paul consumers. The first year's output was 3,000,000 cu. ft., an amount which would supply the present demand for half a day.

Not the smallest of the new organization's difficulties was the keeping of the coal bin full, as the fuel had to be brought by boat down the Ohio River and up the Mississippi, a three months' trip.

The company has kept pace with St. Paul's growth, so that at the present time the building which is not connected with the gas company is the exception.

The early history of Minnesota is closely linked with the early history of the gas company. Those pioneers who were leaders in affairs of state made the existence of the company possible during the Civil War—Generals H. H. Sibley and John Pope were the first officers of the company, and it was to their far-sightedness that the residents of St. Paul in those early days were indebted for the convenience of a gas supply.

A Happy Gas Heated Home

The Rockford Gas Light & Coke Company, Rockford, Ill., recently fitted up such an enticing window that it inspired all who saw it with a desire to have a similar home for himself. A living room was pictured—the floor covered with a large soft rug, on which were strewn several childish toys. In the background was a tiled fireplace, in which was a built-in gas heater. A large tapestry upholstered arm chair was drawn up to the fire, and in this sat a young mother in boudoir gown of blue, with a little child in white upon her lap. Standing by the fireplace, one foot on the fender and arm upon the mantel, pipe in mouth, was a young father in dressing coat and slippers, gazing down at his little family. A large card suggested, "Conserve fuel —The ideal heating system for spring —The radiant fire is the perfect open fire. It fills the room with radiant heat and fire light. It does not smell or vitiate the air. Simple to light and extinguish. Turns down low. Any style to match your room. It is economical and delivers the heat when and where you want it."

Gas Plant at Mt. Auburn, Ohio, to be Considered

The practicability of establishing a municipal gas plant was to be discussed at the meeting of the Mount Auburn, Ohio, Welfare Association Tuesday evening, March 5.

The Preparation of Gas Company Publicity

F. M. Lester Offers Various Suggestions—Gas for House Heating an Opportunity to Test Out the Effectiveness of the Printed Word—Determining the Manner of Presentation

Advertising will not suffice in itself to sell gas or any other product. It is a means to that end—a very valuable aid—but not sufficient unto itself. To effectively prepare copy one must first have a story to tell. Then he must tell it in such manner as to hold the reader's attention to the end. These are the views of F. M. Lester, advertising manager of the Public Service Company of Northern Illinois. He will express them in a paper he will present at the annual convention of the Illinois Gas Association, which will be held in Chicago, March 20. Mr. Lester sees in the house-heating end an opportunity for the gas company publicity man to prove the effectiveness of the printed word. His story lies in comparative efficiencies. The efficiency of the average domestic-heating plant is 30 per cent. Gas as a fuel would attain 80 per cent efficiency. There is the story. Can the gas company publicity man use it in a manner that will carry conviction and sell gas for house heating? An abstract of Mr. Lester's paper, as it will be presented, follows:

An advertisement, considered from a commercial standpoint, is in effect an announcement of an action intended to be performed, or it relates thereto. It is a factor merely in an equation, and taken alone, in the broadest sense, must often fail of its purpose.

Lost Motion in Peanuts

Let me call the humble peanut to the witness stand to testify on this point. Not so many years ago the peanut was thought good enough only to be fed to the hogs in those Southern States where it grew wild. Old Tom Rowland, who has never been given a niche in the gallery of industrial pathfinders, believed differently. To his day and night work is largely due the removal of prejudice against the lowly goober and its subsequent marvelous rise in favor. You can't go anywhere in the country without finding peanuts for sale at the corner.

Now it happened as it has happened before as to many other articles of consumption, that certain promoters looked upon peanuts and were glad, and accordingly claimed them for their own. They gained control of the focii through which peanuts must naturally travel en route to the ultimate consumer. They completely reorganized the industry. They opened the doors of the temple and let in the High Priests of Efficiency, and started a card index and maybe another, or perhaps two or three to index out the ones before. They discovered that there was altogether too much lost motion, that the cost of distributing peanuts was scandalous, for didn't everybody want them? Whereupon, being just as certain of the soundness of their reasoning as was the cunning little ostrich who knew it all and stuck his head in the sand when the hunters came along—he's in this country now, that ostrich—stuffed—our promoter friends discharged all the traveling salesmen who went up and down the country selling peanuts. In their places a campaign of advertising was inaugurated and carried on boldly for six months, when it was discovered that trade had fallen off 60 per cent. Then the traveling salesmen were put back to work. The efficiency gentlemen found out that peanuts, absolutely the best distributed product in the United States, had to be sold.

Advertising a Passive Force if Left to Work Its Own Salvation

It cannot be claimed that the example given is unique. It is only one of a host that may be marshalled in support of an old truth. Nor is it likely that it ever was entirely unknown. Egibi, the rich, respected and widely connected banker of Babylon, was doubtless wise enough to know that the numerous clay tablets bearing his name and telling the nature of his business, which were distributed, were not in themselves sufficient. I don't believe the aspirants for political office, who occasionally got parchments announcing their candidacy fixed on the walls of Roman buildings, were satisfied to let that represent their efforts to win. When Moses came down from the mountain with the tablets of the law, it is not recorded that he stood them up against the lamp post and then walked away. It was not unknown to all these, and it is not unknown to you, I am sure, that an advertisement standing alone is a thing of two dimensions. It is a skeleton whose dry bones must be clothed with flesh, into whose frame life must be breathed by the living personalities who must back it up and convert it from a passive into an active force.

Now, in the ground plan of a paper of this kind, right here sticks out the need of defining advertising. And right here I am inclined to get off the boat. For the question is too big.

It is easy to point to its results—to conspicuous examples on every hand of commercial enterprises raised to high power largely through its aid—to trade-marks representing tangible values running up into the millions created by advertising alone. It is not necessary to emphasize the fact that advertising is recognized as an integral part of well-conceived business policy.

But it is not possible for me, at least, to answer the question just implied in a generalization, notwithstanding there is a definition of advertising in all the standard dictionaries—a few lines—a definition that without too altitudinous a flight of the imagination might be likened to one of those little closed gates in a wall which are features in some Oriental countries. Only if you pass through you find yourself not in a circumscribed garden, but beheld an expanse as wide as the round ocean.

Advertising an Art and Not Responsive to Set Rules

Advertising impinges against and deals with the feelings of the individual of the genus homo and the lining of his dome. And isn't that enough to indicate its complexity?

The truth is neither the slide rule nor any other rule will tell you how you may so advertise as to invariably gain exact results, for advertising is an art. And the rules that govern an art—any art that demands for its complete achievement the co-operation of the public, to put it that way, as in reality all art does—are nebulous if they exist at all. If that were not true, accurate judges of dramatic values would never produce a play that failed. No punk book would ever be printed to go to the Gehenna of other things punk. In the pure art of acquiring commercial success a lot of us here could walk out of the room with a capital of one cent and a scheme that must gain constant momentum and exaggeration and come back with a million dollars. Only things wouldn't connect.

The Dress

Manner in advertising means the typographical arrangement of an advertisement, or, in other words, its dress. In its way, it is an expression of the same activity and effort displayed by an artist on "hanging day" in the aim to secure a place for his picture where it can be seen to best advantage. You see the importance of it.

If it is surrounded, as it usually is, on all sides by other advertisements, manifestly yours must be distinctive to bring it into the focus. It is dress which gives your ad a place in the sun. You have only one material with which to work, but a large variety of this, to wit, type forms, and their more or less assistant—just that—the cut.

Type faces used to be named according to their sizes, as, for example, pearl, agate, nonpareil, minion, brevier, etc. Now, however, in measuring height the point system is followed, a point being 1/72 of an inch. Not all type conforms to this scale. Indeed, in several families of type, most of them effective and therefore popular, the designation of size is arbitrary—a fact to be kept in mind when those faces are specified. The thickness of rules used for borders and in underscoring is systematically measured, but the plan is not the same as that governing type.

Occasionally in a printing office there is a compositor who given a piece of advertising copy can execute it in type in a manner that brings out properly the elements which converge to create a picture. But such a compositor is a rare bird, and my suggestion to the gentlemen whose duty it is to prepare advertising matter is that they obtain from the newspapers used size cards showing, as is implied, sizes of type and also their varieties of design, and acquire a familiarity with these. Thus they will be enabled to direct the make-up of their advertisements and secure for them the appearance desired.

The Copy Writing

If you ask me what rule governs this construction so far as the gas industry is concerned, I reply there

is no rule. Nor is there any hard and fixed rule as to the advertising of anything else. In the printed presentation of a dignified financial proposition, you would not use the bold black type, italics and heavy underscoring rules, by means of which you would shout out your points in an exploitation that verges on an argument, may be. The occasion, the subject, the purpose — numerous other considerations dictate the physical structure of an ad, and if it is your job to get up one that will catch the eye and hang on to it until its other tentacles take hold, I don't believe you need look for much help outside of your own judgment, taste, discrimination, sense of balance, and observation.

Now, then, the matter—the material to which the typographical display of an ad invites attention. If there is anything sure besides death and disappointment it is that an ad to get across must be interesting.

That's a plain certainty.

There must be a story to tell, and it must be told in readable fashion in such a manner that it will hold a reader's attention to the end. I know this is an ideal. I know its realization is rare—often so to him who seeks to rise to it it is an impossibility. But it's none the less true.

You must tell a good story. I am not going to tell you how to do this. I am not going to take a contract to tell anybody how to play billiards, or how to paint the sunset, or how to succeed, and so forth, and so forth.

The accomplishment of such results is an act of the individual.

I have known some teachers of art who, if steamboats were $4 a dozen, would be worth as much as the binnacle lamp on one. Maybe 10 cents a barrel would be a fairer price. It is perfectly true that at times there have risen giant figures who have stamped their impress on the contemporary generation and succeeding generations. And even they have given chiefly a new interpretation of old principles. Art cannot be taught and you'll have to dig the story in your ad out of yourself and supply the method of telling it.

Desirability of Brevity

Perhaps it will be permissible, however, to suggest that brevity is the soul of wit, and terseness of expression is the essence of strength. Also that fiction, as has been proved over and over again, is no stronger than fact. And in the business of advertising this industry, if you'll stop and look at your hand you'll discover you've a straight flush—a corollary of facts, strange and interesting, that need no frills in their description. It may be allowable also to say, don't be afraid of going over somebody's head in your story.

When I can't help it I sometimes pass a building in Chicago wherein is located a song foundry with an 87-hp. megaphone through which the assault is brayed into the open air. The crossing policemen probably after a while have to choose between a residence in the State foolish house or a transfer. I have never actually seen anybody passing the place become suddenly insane, but I have seen people with a pained expression hold their ears. Likewise, I have stood there when Sousa's band has passed and I have noticed the lift of the music straighten bent forms. It didn't go over their heads, and you won't go over any heads in your story if you say something, for you write it for just folks. That's what we are. Don't be fooled by a fallacy.

Ample to Write About

The advertising case of the gas industry is provided with plenty of ammunition. That has been said before in this paper, but as a good thing will stand repetition I fetch it in again as a peg whereon to hang something more.

I have heard the gas industry compared in these parlous times to a voice crying out in the wilderness. Probably this moment a social, economic and spiritual revolution is under way as an effect of the cataclysm whose results touch every inhabited part of the globe. It's a curious truth that although the Roman court in the two centuries following Augustus was filled with keen observers and writers, who wrote minutely on many subjects, none of them estimated properly the growth of Christianity, destined to become, a few centuries later, the greatest influence in the world. There may be here and there men of that vision which characterizes the true leader. But to most of us is not given the power to see clearly in all their proportions events in which we play a part. We must seek, then, to learn in the philosophic teaching of history, the searchlight whose rays penetrate farthest into the future.

When the Soldiers Come Home

That strange pause which follows every great war—the era of planning readjustment—is brief always, for Nature steps in. Nature, the indomitable, the unconquerable, that follows close the wrack, that as the guns move forward refructifies, reclothes, redeems the ruined soil of France—Nature works to repair through all her works.

Do you remember that for twenty years before the Civil War the Union Pacific Railroad was debated in Congress, and that the grandmas and grandpappies there wound themselves round and round in a web of argument that it was an impossible work until they couldn't bite themselves loose? And do you remember also the men who came home from the war built the railroad in the next four years? Our greatest internal development followed that war, led by the men in it, unafraid of difficulties, for they had dared the cannon's mouth.

We know some gentlemen recently in this industry, but now in khaki and in blue, who have gone across and are going across for us. Good sports all. They went away boys. They'll come back men tried out—tested out in a crucible. I fancy they will return messengers with something to say in that new era that, when the war ends, must dawn in this old business.

But now—this moment—if it be true that the gas industry is a voice crying out for relief, is it likewise certain that it issues from a wilderness and not from a field yet largely untilled? Is it a sure-pop fact that tradition and theory are each sound, that functions and potentialities are cribbed and confined within defined limits, escape from which is impossible? Impossible is a word that becomes more unfashionable daily.

Past Impossibilities

It is resorting to familiar comparisons, I know, to say, respecting the word impossible, that the gentlemen who sniffed at the original telephone might now be trotted in and they would hear a voice come over the wire from a distance of some thousands of miles. The wise men who settled it in a word that flying was a specialty of the feathered family ought to take a peek at the inhabitants of the air in one part of the world. And the other valued coun-

sellors who were scornful when telegraphing without wires was mentioned ought to see now one of the many ships that talk with others underneath the horizon. I venture to present as an exhibit the Standard Oil Company. Through years of alternate calm and stress that magnificent commercial organization has gone on ladling out, not little old, but big dividends. Almost from the beginning of the oil industry some fifty-odd years ago, the Standard has led as a refiner of oil. It has spared no pains nor money in research into the nature of petroleum. Ten or fifteen years ago it was acknowledged that over 100 by-products were obtained from the oil of the Eastern fields. I don't know that it would be fair to say that the discoveries made in the past few years concerning the nature of oil and its possibilities are such as to stamp our accumulated knowledge as a kind of learned ignorance, but I have heard mighty smart refiners say we don't know much about oil.

NEED OF A BROADENING OF FUNCTIONS AND A MULTIPLICATION OF PRODUCTS

Probably I am stepping off my tripod in saying much of this, and in suggesting the lessons derivable from it. But I've gone and said it, and in the same spirit continue, that if the voice of this industry is crying for relief, you cannot pull down a silver trumpet from the skies. Did you ever hear of the man who hunted around the world for a certain rare gem, and returning found it lying on his own doorstep? Relief obviously is within yourselves. And if you guess that I imply there must be a broadening of functions and a multiplication and increase of products, your guess won't be wrong.

There is one big field of business that I am certain you're going to enter—as certain as I am of anything that hasn't been done. You are going to heat houses. If the average domestic-heating plant shows, as I am informed it does, an efficiency of about 30 per cent, while gas as the fuel would obtain an 80 per cent efficiency, there is an economic waste whose cure is in your hands. You'll find a way to apply it. In the operation the public must be educated, and right there begins one of the greatest advertising opportunities that ever came under my notice—a story to tell that told well must wedge its way into and hold a public interest that presently will express itself in action, if the gentlemen of the selling departments will stand pat and put in your best licks for it. Granted this story is well told, granted that it is backed up, I don't believe the results will leave you in any doubt as to the force of the printed word.

Ohio Cities Company to Open Branch Office in Dayton and Will Supply Motorists

Following its establishment of two gasoline filling stations in Dayton, the Ohio Cities Gas Company is planning to open a branch office in Dayton, according to word received from Columbus.

Dayton will be made the distributing point for near-by territory, and the company is planning to convert the old Dayton "D" handle plant into a distributing depot.

Several additional filling stations will be erected at points convenient to automatic traffic, and a fleet of trucks will supply gasoline to garages.

George L. Shinnick, present manager of the Columbus branch, will be in charge of the Dayton office.

Gas Engines to Run Cargo Ship

The Union Gas Engine Company has completed the installation of the power equipment of the "Palewan," which made her trial run recently. Captain Taylor is master of this vessel, which is owned by Atkins Kroll Company, San Francisco. The "Palewan" will make her maiden voyage to Napier, New Zealand, with a cargo of case coal oil. The engines are two 110 hp. Union gas engines driving twin screws; also Union Gas Engine Company equipment for the hoisting gear and windlass hoist. A separate plant of gas engines are for the electrical generating equipment for electric lights and ventilating systems. This is one of the best equipped vessels that has left Oakland, Cal., harbor in many a day.

How Utility Costs Have Advanced Lately

A committee representing the most important gas companies and all the principal electric light and power companies, and street railway companies of the country recently submitted to the comptroller of the currency a report in which attention was asked to the increase within the last two years in the cost of materials they must use for the maintenance of their properties. They gave a list of percentages of additional cost, showing among others the following items:

INCREASE FROM 1915 TO 1917

	Per Cent
Copper wire	180
Pipe, cast-iron	100
Axles	272
Acids	162
Brass	300
Car forgings	216
Castings, malleable	198
Copper, bar and sheet	147
Lead, pig and sheet	127
Nails	110
Steel, tool	400
Tie-plates	276

Testing Laboratory at Malden, Mass., Destroyed

The boiling over of a kettle of tar in the process of testing in the tar plant of the Gas company on Commercial Street, Malden, Mass., resulted in the destruction of the laboratory by fire.

James O'Brien, of Everett, who is employed by the American Tar Company, was in charge of the operation, and it was the first time the laboratory had been opened since the severe weather.

The kettle was over a gas stove being heated and Mr. O'Brien left the stove to answer a phone call. In his absence the kettle boiled over and took fire. In an instant the entire building was in flames and Mr. O'Brien was driven out by the thick black smoke. In his effort to beat out the flames he had his right hand painfully burned.

The building is one story high with a galvanized tin outside. The interior was completely burned out. The damage will be about $1,500.

Wakefield, Mass., Rates Increased

The Wakefield (Mass.) Municipal Light Plant has announced that consumers of gas will pay the increased rates beginning March 1. On March 31 bills the price of gas will be $1.35 a 1,000 cu. ft., an increase of 15 cents. The discount to commercial customers using 30,000 cu. ft. or more will not be changed.

New Uses for Industrial Fuel Gas

(*Continued from page* 244)

control and satisfactory results obtained in all respects.

Close Temperature Control an Essential in Chemical Plants

Chemical companies that manufacture products for commercial use often buy scrap or "junk" of different kinds, containing the chemicals they need. These they extract by putting the scrap through some certain process or sometimes through many processes. Before the product which can be sold on the market is obtained, these chemicals are put through different processes of chemical reactions, of which 90 per cent require heat. If heat is not essential it is often expedient to use it, for it will cause the reaction to take place more quickly, and consequently warrant the expenditure due to the application of heat.

Gas as a heat medium is highly advisable, and its uses in a chemical plant are unlimited. Chemical manufacturers require a certain definite range of temperature that may vary but a few degrees; if a great variation occurs the product might become a chemical other than the one desired. Therefore, a perfect control of temperature is essential. The nature of the flame used also plays an important part; often powdered coal is used as a reducing agent, and if an oxidizing flame be used results obtained would prove disastrous. Again, in other instances, an oxidizing flame is very essential. With gas fuel, any kind of flame can be obtained at will.

One of our chemical companies have a number of retorts 7 ft. in diameter and 18 ft. long. Originally these were heated with coal to a temperature of about 2,200 deg. Fahr., and at times very good results were obtained. But, as is always the case with coal-fired furnaces, the temperature would vary. The fire boxes must be cleaned twice a day, at which times the temperature would drop, and then when fired again would often rise too high. Eight charges were all that it was possible to obtain through one retort in twenty-four hours. On the chemical tests of the materials some charges would run "low" and others "high." The average was, however, good.

Manufacturer's Estimate of Gas Needed More Than Double What Practical Operation Showed

When we called on this manufacturer he was very skeptical about gas as a fuel. According to his figures it would take approximately 8,000 cu. ft. per hour per retort and the cost would be out of the question. With much hesitation he installed piping and burner equipment for one retort, and allowed us to run a thirty-day trial. After some experimental work we found that we could turn out ten or eleven charges per twenty-four hours, as compared with seven or eight charges possible with coal. The percentage of conversion was found higher and a more uniform product was obtained. The actual cost of 100 lb. of material heated with gas was less than when heated with coal. The product, too, is uniform because definite temperature elements are maintained. One gas burner in the end of the furnace is used with a fan blast, and the gas consumption varies from 2,700 to 3,000 ft. per hour per retort. A temperature of 2,200 deg. Fahr. is maintained .

In plants of this nature the advantages of gas are exceedingly numerous. The complete heat control permits an immediate change in temperature should the retort become the least hit too hot or too cold. No sudden changes of temperature occur as in coal-fired furnaces due to cleaning of fire boxes or when fuel is added, should the fire bed be thin. No losses occur due to a tired night fireman who may sleep instead of keeping the fire as he should.

Gas can always be had and with less trouble (to the consumer) than other fuels. There are no delays due to irregular deliveries, no fluctuation in price, no demurrage and no expense due to handling. Labor troubles and disturbances do not affect the gas supply. Coal requires men, for it must be moved from car to the storage, from storage to floor and from floor to the fire box. Gas eliminates all these expenses, for not only does it need no handling nor cleaning of fire boxes, but the company in question has been able to do away with one fireman and one coal wheeler per retort. Gas saves space, no storage room, nor floor space for fire boxes is necessary. Expense due to maintenance of gas burners is considerably lower than on fire boxes. Time is saved, for the cold furnace can be heated to working temperature much more quickly than was possible with coal. A uniform percentage of conversion is more easily obtained, and a much greater percentage of work is accomplished.

Drying chemicals of various natures by gas is also being done. Brick ovens are generally used for this class of work, and if a low temperature is desired atmospheric burners can be used advantageously. Care should be taken that the required secondary air is supplied, and that the oven is properly ventilated.

Can Manufacturing

One of our consumers is a manufacturer of tin products of various kinds, particularly milk cans, metal churns and special shapes, one of their largest present orders being a Government contract for thousands of bread tins. This company does not buy tin plate, but makes the articles from steel and then tins them in their own "stacks." The process the steel goes through before it is a finished plate is indeed interesting.

It is made into the desired article first of all, but before the tin can be applied each article is carefully annealed, whereupon it is ready to be taken to the tin house.

When it arrives at the tin house it is first washed in a soda solution which is cleaned off with hot water. Then it is pickled or washed in muriatic acid to remove all the scale and other impurities that may still adhere to the steel. After the muriatic acid bath it is thoroughly rinsed before being taken to the stack where it is tinned. The first "dip" is in a rough tin, which is washed carefully with oil. Thereupon it is dipped a second time in tin of a higher, finer grade. This, too, is washed with oil, the oil is then removed with kerosene oil, and the "plate" is finished. The number of "dips" vary according to the nature of the article to be manufactured, in some instances one coat being sufficient, in others as many as three being necessary.

Heat is unquestionably a most important and essen-

tial element in all of the above processes. The low melting point of tin makes it easy to use coal as a fuel, and, consequently, it has been used under a majority of stacks. Natural gas, too, has been used for years. The use of artificial gas is only of more recent years, but it is proving very efficient and successful.

Coal requires more labor than does gas, for with the latter as a fuel no handling of coal or ashes is necessary and a fireman is dispensed with. Also, a more definite temperature can be maintained than would be possible with coal. The first cost of a gas "stack" is less.

The plant in question has four stacks with an average gas consumption of 1,200 ft. per hour. Hoods are placed over these stacks to carry off all fumes. The work being of a small type not much tin is used. Heavy steel that requires a greater amount of tin will, of course, raise the gas consumption in proportion.

This plant has three continuous annealing furnaces, 20 ft. long, in which gas as a fuel has met with results that far exceeded our greatest expectations. These furnaces are 19 in. wide, 10 in. high and 6 ft. long, and a temperature of from 1,400 to 1,600 deg. Fahr is maintained. The furnace is equipped with several small blast burners on each side and the consumption per furnace is about 600 ft. per hour. With their present manner of operation it is possible to anneal 9,000 pieces of steel in ten hours in each furnace.

In addition to the above mentioned furnaces, this plant has installed twelve gas-fired soft-metal furnaces for the tinning of small pieces, which have also proven a success. In the operation of these furnaces only one man is necessary to a furnace, the material being handed to him already "pickled."

Another of our consumers manufactures tin cans and uses gas for all of the various stages and processes. The use of gas for tin cans is not entirely new, but it is a very interesting phase of the industrial gas business. The majority of the companies have spent large sums of money trying to use superheated steam, gasoline gas or producer gas, in place of solid fuels or oil. The first proved too expensive, and temperature control was found nearly impossible. The second was dangerous. One can company we serve had several serious explosions when using gasoline. Producer gas was found better adapted than the perceding heat agents, but that gas contains only 100 to 125 B.t.u. per cubic foot, and the cost was equivalent to that of city gas, and it is not nearly so clean or reliable. Anthracite coal is hard to obtain at the present time, and the same is true of bituminous coal. These difficulties are all solved by the use of city gas; it is economical, easily regulated, less dangerous and easily obtained. Its efficiency has repeatedly been proven.

Making the Can

The various processes the cans go through before completion is very similar among the different companies, although certain machines may vary somewhat. On a round can the seam is first soldered in a continuous machine. This requires a very small amount of gas and the process is rapid. The ends of the can are placed on the body, and one end is soldered on the body in a "floater." This "floater" contains a pot about a foot wide and about 10 ft. long and 4 in. deep, which is full of molten solder. The heat is applied from below by a series of gas burners, so that the operator can maintain varying temperatures in different parts of the float. When the can enters the float it is at an incline of a small angle, so that only the end to be soldered is revolved in the molten solder. As the can leaves the float it is brushed and all the loose particles of metal are saved. The process is repeated in soldering the other end, and then the can is tested by means of compressed air and water.

The method of manufacturing other cans is very similar. Square cans have a soldered seam on the side, and the ends are dipped in solder. The sanitary cans have a soldered seam, with the top and bottom put on by friction. In all these operations gas is the heat agent used.

The last process is to solder the small piece on the top of the can after it has been filled. This is also done in a continuous machine. A number of blast burners heat twelve or fifteen irons, and as they revolve they solder the tops of the cans. This appliance uses a very small amount of gas, but proves very satisfactory to the user.

Results with Gas

That gas is of great benefit and value to the consumer will be noted from the vast amount of work accomplished, as shown by the following results:

Eighty thousand pint cans (round) are made in ten hours with a consumption of only about 3,000 ft. of gas. The gas being used to melt the solder and heat the cans before they are soldered.

The melting by gas of tin, lead and solder from large bars or pigs into thread or wire or into the forms of solder is to be used in another sources of revenue for the gas company. The brushings from the different machines are all swept together and the solder is recovered by means of gas-fired dross furnaces.

Some can plants are abandoning the use of paper labels and are having their advertisements printed on the can by a system of lithographing. This requires ovens to dry the varnished and finished sheets. These ovens are gas ovens, 4 ft. wide, 35 ft. long and about 3 ft. high, and of the continuous type. After a plate or sheet is placed in the oven it requires approximately thirty minutes before it has passed through the oven. A temperature of 275 deg. Fahr. is maintained. Atmospheric burners are used and the secondary air is admitted from the bottom of the oven. In three such ovens 36,000 lb. of tin plate or sheets are heated every day with a gas consumption of 7,200 ft. These ovens have proven so satisfactory to the consumer just quoted that they are to install three additional ovens in the near future.

Automobile Manufacturers

Automobile factories offer a large field for the gas companies. Body, chassis and fender ovens are used in these industries, which must have a temperature varying from 150 to 450 deg. Fahr., according to the nature of the work to be done. The heat is generally furnished through electricity, steam or gas. Steam is unsatisfactory because it is almost impossible to obtain different temperatures quickly for only a small range can be maintained. With electricity good results are obtained, and the desired temperature can be maintained, but in most cases the cost of operation is excessive and a continual renewing of heating elements is necessary. Gas as a fuel is so arranged as to heat

the oven with indirect heat, proper care being taken that no fumes or vapors come in contact with the work.

Some interesting ovens of this type can be found at the Elgin Motor Car Corporation plant at Argo, Ill. A continuous chassis oven used there, 100 ft. long, 8 ft. wide and 7 ft. 4 in. high, turns out 100 chassis per day with a maximum temperature of 150 deg. Fahr. It requires fifty minutes to dry a chassis with a gas consumption of about 2,000 cu. ft. per hour.

The plant is equipped with four fender ovens, each 9 ft. wide, 16 ft. long and 10 ft. high, having a capacity of 100 cars per day. These ovens are operated with gas, and consumption of 4,000 cu. ft. per hour is required. The temperature maintained will vary according to the color of the fenders, but 400 deg. Fahr. is about the maximum.

Four body ovens, each 20 x 19 x 18 ft., have a capacity corresponding to the other type ovens and use approximately 2,000 cu. ft. per hour with a maximum temperature of 175 deg. Fahr. The use of these types of ovens are not unusual nor new to the gas man, but merely cited to show what can be accomplished.

Running the Motor Test on City Gas

When a motor is assembled it is necessary to test the same. To do this with gas is not new, but very interesting. The motor is usually run on "no load" for a period of three or four hours, and then increased until "full load" is reached. A check valve on the gas feed pipe connected with the motor eliminates the danger of leakage, and a proportionate mixer valve regulates the amount of gas and the air supplied to the motor.

After these gas tests the motor is generally run by gasoline for the final tryout. Testing with city gas at 600 B.t.u. in this manner is equivalent to 8-cent gasoline, a large saving being shown for the customer.

Foundries

Core ovens and foundries should all be good "prospects" for any industrial gas man. Core ovens are usually designed to burn coal, coke or wood. There are serious objections to these fuels, however. With them it is impossible to obtain a constant temperature, and as a result cores will often be burned and ruined. The temperature in the oven varies in different parts according to the distance from the source of heat. Every ruined core is a loss, and some may be of great value.

Core ovens fired with gas dispense with this loss. A constant heat can be maintained throughout the oven with practically no varying temperatures. Cores placed on any shelf, either on trucks or on sides of the oven, will all obtain the same amount of heat, so there should be no losses due to burned cores unless the operator is careless and allows the temperature to rise too high.

Gas companies should get this business even if exceedingly high rates are made, as more money is saved the manufacturer through the elimination of burned and ruined cores than the gas costs him for fuel. For although many manufacturers would not admit losses, it is a fact that an average of from $5 to $10 per night is spent on burned cores in the average oven. This does not include the cost of hauling coke, cleaning ashes, labor for firing during the night or rental of floor space for fuels.

In installing gas, special care should be taken to see what kind of sand the different cores are made of, as some require higher temperatures and longer baking hours than others. Pipe burners with special blast heads are used and air is obtained by fan blast with a very small power charge. One of our consumers operates fourteen core ovens all gas fired, and all with very good results, with a total gas consumption of 12,000 cu. ft. per hour.

In foundries, gas may very successfully be used in the heating of ladles. Large ladles are used to transfer the charge of iron from the cupola to the molds. They should be heated to a yellow color before the iron is allowed to run into them. This is usually done either with oil or with a coke fire built in the ladle itself. The coke fire method means considerable labor in the handling of ashes and in watching the fire, while with oil the use of high air pressure is necessary, and a carbon deposit remains in the ladle.

With gas the ladle is heated much more rapidly and with less work, dirt and trouble. It is placed side down with the opening near a wall which contains a blast burner. Each ladle has its individual burner and as many ladles as are necessary may be heated at the same time. The heating of small ladles is similar to the method used in the larger ones, but they are placed upside down over a gas flame.

A gas torch for lighting the cupola is very advantageous. It saves time and coke, and there is no danger of the fuel failing to ignite. Large molds can be dried with the gas torch.

Smith Shops

In blacksmith shops a variety of uses for gas may be found. Tool dressing, forging, case hardening and the numerous other processes to which metal is subjected are being done by gas in many plants, but as yet this phase of industrial work has not generally been developed on a large scale with economy.

During the past year we have experimented on four or five different types of forges trying to end-heat ¾-in. round stock with a dripping heat and obtain results as obtained by oil. The cost of gas was not a question considered, the aim being merely to obtain a forge able to do the work and hold up for a warranted length of time. A forge was turned out able to heat 500 ¾-in. stock with a 2-in. dripping heat per hour with a gas consumption of 1,100 ft. per hour. This was considered as good an output as their oil forge.

One of our consumers is using gas in carbonizing with great success. Each of his furnaces contain three compartments 60 in. long, 36 in. wide and 18 in. high, and a temperature of 1,750 to 1,800 deg. Fahr. is maintained. Large cast-iron boxes, which are very heavy, contain the carbonizing material and material to be carbonized. After five months' usage, no repairs have been made nor have any of the cast-iron boxes been ruined.

Coke had formerly been used as fuel, the flames of which would play directly on these boxes and make them very short lived. There are six blast burners to a furnace, two to a compartment, with a total maximum of 3,600 cu. ft. per hour. A more uniform product is obtained with gas, as the heat can be perfectly regu-

lated. Much labor due to the handling of coke and ashes and to the cleaning of fire boxes is dispensed with.

Without doubt there are many other ways in which gas might be used in a blacksmith shop, but the above mentioned seemed of special interest.

Manufacture of Saws

Saws, because of the various kinds and qualities, naturally offer a wide radius of methods in the manufacture thereof. The underlying principles of all the processes are very similar in nature, however, for all necessitate a certain amount of straightening or flattening and tempering.

Whether the saw be a round saw, hand saw or long saw, a cross-cut saw or any of the other various types, it must be well tempered and straightened or flattened. All of these results are obtained through various applications of heat. Whether the saw be large or small the process is the same. Therefore, no matter what the nature of the output of the saw manufacturer, a large volume of business should be obtained from him by the industrial gas man.

At the present time a large majority of manufacturers are using oil as a fuel, and it may be hard to convince them that gas will prove more advantageous, and still the advantages are really multifold.

Disastrous Effect of Oil Fuel

The temperatures necessary vary according to the nature of the work, in this instance ranging from 1,000 to 1,600 deg. This temperature should be easy to maintain if the gas is properly applied.

With oil-fired ovens, scaling can hardly be overcome, often being so bad that the material is entirely ruined. To burn a reducing flame with oil is nearly impossible, while if the reverse is used the iron will oxidize. With gas this perplexing problem is overcome for there is no oxidization and no danger of scaling. This advantage alone should be of sufficient importance to convince the manufacturer that gas is a superior fuel.

One consumer consented to replace oil with gas in one of his tempering furnaces. The furnace is one used for circle saws up to 60 in. in diameter and hand saws up to 18 in., and is 10 ft. deep, 6 ft. wide and 14 in. high. The temperature maintained is 1,600 deg., and six special blast burners are used with a gas consumption of 1,800 cu. ft. per hour. The results obtained were above all predictions; not only was the production increased, but the quality of the work was bettered. This furnace is hardening 225 large circle saws per day, and the speed could undoubtedly be greatly increased.

This success led to a complete change to gas in the heat-treating department of this saw company. All of the furnaces with the exception of the above-mentioned, straighten or flatten the saw as it is being tempered. When this is not the case a separate process is then required.

One straightening and tempering furnace 9 ft. deep, 4 ft. wide and 15 in. high is used for cross-cut saws. In it a temperature of 1,100 to 1,300 deg. is maintained with a gas consumption of 3,600 ft. per hour. Two blast burners have been installed and very good results are obtained.

Another of the hardening furnaces is 14 ft. deep, 7 ft. wide and 22 in. high. In this large furnace a temperature of 1,500 deg. Fahr. is maintained with a gas consumption of 9,600 ft. per hour, and twelve blast burners are used. Thirty-five to forty 7-ft. saws can be hardened per hour.

A limbering bath is necessary for long saws, and for this process a furnace 2½ ft. long, 4 ft. wide and 15 in. high is used. Only 450 deg. Fahr is required, and this is accomplished with a gas consumption of only 400 ft. per hour with one blast burner.

A hardening and flattening furnace used on circle saws up to 30 in. in diameter is 4 ft. high, 18 in. wide and 5 ft. deep. The saw is placed between discs which revolve in a vertical plane, and in this manner it is held and remains perfectly flat. The temperature is kept at 1,000 deg. Fahr., and twenty-three 30-in. circular saws can be hardened and flattened per hour.

Waste Mine-Gas May Be Capitalized and Used as a Pension Fund

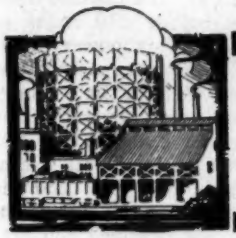
Governor Brumbaugh, of Pennsylvania, who has enthusiastically supported the plan of utilizing waste mine gas as a substitute for coal, is so well convinced that the millions of cubic feet of methane going to waste in the anthracite fields daily can be successfully corraled and used that he has proposed to some of the anthracite operators that the coal companies permit the waste gas to be put to a commercial use and that all profits derived from such an undertaking be used to create a pension fund for the support and care of aged mine workers and their families.

Conservative estimates are that a fund of hundreds of thousands of dollars could be created and that the question of old age pensions would be entirely removed from the thoughts of the coal producers.

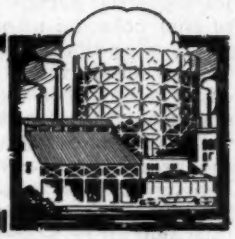
Experts on gas estimate that there are 100,000,000 cu. ft. of methane wasted every day in the anthracite fields. According to the best authorities 22,000 cu. ft. of gas has a value equal to that of 1 ton of coal. The methane that is escaping is pure, and it is a scientific fact that methane is at its most explosive point when mixed with nine and a half times as much air. On the assumption that there are 100,000,000 cu. ft. wasted, and that it can be used to best advantage when mixed with nine and a half times as much air, means that 1,000,000,000 cu. ft. could be used for commercial purposes out of the waste alone, and in round figures this would mean the saving of 50,000 tons of coal per day.

Joseph J. Walsh, mine inspector in the Fourteenth District, declares that there are feeders in the anthracite field throwing off 100,000 cu. ft. a day. He declares he has known feeders that have produced 1,500,000 cu. ft. daily. This is from one mine only.

Whether methane can be collected in a pure state undiluted by air, has been a question. R. V. Norris, prominent engineer and mine expert, says it cannot, generally speaking. Against this is the word of Mine Inspector Walsh, equally as prominent as a gas expert, who says "methane can be collected in a pure state from feeders and bore holes."



NEWS OF THE GAS INDUSTRY



Chicago Company Denied Increase at Present Time — Commission Ruled that City Has No Authority to Set Rates

The Peoples Gas Light & Coke Company, of Chicago, lost the fight for immediate emergency to increase gas rates, but won contention that the State utilities commission and not the city of Chicago has authority to fix rates by decision of commission rendered March 12.

The commission ruled that the contract between the city and the company providing that the present schedule of rates be maintained for the year ending July 31 next is legal, and said no change in rates will be permitted before that date.

The commission overruled the objection of the city attorneys that the State body had no right to set rates in Chicago. This phase of the decision may have a very important bearing on the city's suit for the refund of $11,000,000 alleged overcharge, inasmuch as one of the company's contentions in defense is that the city had no authority to set rates.

Boetius Sullivan, attorney for the gas company, says they could appeal to the Circuit Court and compel the commission to hold immediate hearings on rates, but they have not yet decided whether this will be done.

The commission offers to hold a hearing on the matter after the expiration of the contract with the city.

U. S. Bureau of Standards Appoints Consulting Gas Engineers

The Bureau of Standards has announced the appointment of Samuel S. Wyer, a consulting engineer of Columbus, Ohio, and Willard F. Hine, chief gas engineer of the Public Service Commission of the First District, New York State, as consulting engineers on the staff of the Bureau of Standards.

These engineers will assist the bureau in conferences and special investigations from time to time in order that the bureau's regular staff may be augmented for particular and important work. These two appointments are the first which have been made by the bureau under its new program of appointing specialists in different fields to assist it as advisers and consultants in its investigations.

Sheridan Gas Plant Purchased by Denver Man

The Sheridan, Wyo., gas plant was sold recently at the receiver's sale to A. C. Foster, of Denver. The property brought $82,390.

Mr. Foster said the plant would continue in operation and that he would use coal from Colorado.

Municipal Gas Plant at Albion, Neb., Closes Down

After struggling along for several years, the Albion (Neb.) gas plant has gone out of business. Advancing prices of coke and oil, with the impossibility of raising the rates, are ascribed for the shutdown. There remains about $12,000 to be paid on the plant.

Massachusetts Light Sales Show Gain

The gas and electric light companies owned by the Massachusetts Lighting Companies report aggregate net sales of gas and electricity for January, 1918, $138,202.80, as compared with $128,916.58 for January, 1917, an increase of $9,286.22.

For the seven months ending Jan. 26, 1918, the net sales were $927,421.99, as compared with $827,508.55 for the same period last year, an increase of $99,913.44,

Industrial Gas Users Will Tell Gas Man the Advantages They Derive from Use of Fuel

Despite the exigencies for gas companies and gas men created by war conditions, the extraordinary severity of the last winter and the fuel and transportation troubles, indications are that the fourteenth annual convention of the Illinois Gas Association, which is to be held at the Hotel Sherman in Chicago on March 20 next, will be a success in more than one way.

Three things stand out from a great many others as positive assurances of the success of the meeting:

1. The program is the most complete and most compact that has ever been crowded into one day of any convention of the association.

2. Information in the hands of Horace H. Clark, secretary of the association, indicates a heavy attendance.

3. For the first time in the history of the industry the possibilities of the industry will be told not only by gas producers but by gas consumers.

This feature of the convention is not mentioned in the formal program, apparently having been reserved for the membership as a surprise. The gas consumers will appear before the convention following the reading of a paper on "New Uses of Industrial Gas" by C. H. Kallstedt, of the industrial gas department of the Public Service Company of Northern Illinois.

Secretary Clark, who happens also to be the head of the industrial gas department of the Public Service Company, is father of the idea, and it is through his efforts that half a dozen of the company's biggest gas consumers consented to appear before the convention and tell exactly how the efficiency of their respective plants has been increased through the use of gas

for industrial purposes in the place of coal, coke, oil or other fuels.

The stories that these men tell will be substantiated and illustrated by stereopticon views of the installations they describe.

"In the industrial use of gas lies the greatest opportunities of the industry to-day," said Mr. Clark, "yet many of the big gas men of this and other States have given comparatively little attention to this field. The trouble lies in the fact that the gas manufacturer does not mix enough with the gas consumer. That is why we have arranged for some big consumers of industrial gas to come to the convention, meet the producers and sellers of gas, and exchange ideas on the general subject of industrial installations."

Personal Notes

JOHN OWEN, manager of the Muskogee (Okla.) Gas & Electric Company, is to replace William R. Molinard as resident general manager of the Oklahoma Gas & Electric Company for Oklahoma City.

W. R. MOLINARD, general manager for the Oklahoma Gas & Electric Company, Oklahoma City, has been promoted and will now have charge of all the operations of the Byllesby company in Oklahoma. He will make his headquarters in Oklahoma City.

GEORGE H. WILMARTH, formerly manager of the Sapulpa Electric Company, has been appointed manager of the Muskogee Gas & Electric Company, Muskogee, Okla.

R. C. COFFY, formerly manager of the Puget Sound Gas Company, Everett, Wash., will succeed Mr. Wilmarth as manager of the Sapulpa Electric Company.

M. L. HIBBARD, manager of the Union Light, Heat & Power Company, Fargo, N. D., was elected president of the Associated Charities of Fargo for the year 1918.

J. H. LAKAMP, superintendent of the gas department of the Union Gas & Electric Company, Cincinnati, Ohio, is seriously ill with pneumonia. Mr. Lakamp became ill from exposure suffered during the gas explosion in the west end of the city a short time ago.

HENRY J. FULLER, vice-president of Fairbanks, Morse & Company, was elected a director on the board of the Consolidated Gas, Electric Light & Power Company, Baltimore, Md., at a recent directors' meeting, to fill the vacancy on the board caused by the death of Gen. Thomas J. Shryock. Mr. Fuller is interested in enterprises in Baltimore and is actively associated with a number of the largest industrial companies in the United States and Canada.

THE HAVRE DE GRACE (MD.) GAS COMPANY held the annual meeting of the stockholders recently, at which the following officers were elected: Samuel W. Appleton, of Philadelphia, president; J. W. Maslin, Havre de Grace, secretary and treasurer, and James H. McHale, of Philadelphia, superintendent.

R. G. ALTIZER, of Charleston, W. Va., general counsel of the Columbia Gas & Electric Company, was elected a director of the Union Gas & Electric Company, Cincinnati, Ohio, at the recent annual meeting to fill a vacancy on the board. Robert A. Taft and Samuel Assur retired from the board. Other directors were re-elected.

JOSEPH LIGHT, who was superintendent of the Dayton (Ohio) Gas Company for about fifty years, died Friday, Feb. 22, 1918, at Chattanooga, Tenn. He was on his way to Florida to spend the rest of the winter when he was taken sick and was forced to get off the train at Chattanooga. He died after a week's illness of pneumonia.

STEPHEN C. POHE, manager for Electric Bond & Share Company of the operations formerly controlled by the Columbia & Montour Electric Company and the Northumberland Gas & Electric Company, has resigned his position to accept a position with H. D. Walbridge & Company, former owners of the operations Mr. Pohe managed for them and is now managing. Mr. Pohe's resignation takes effect April 1. He will make his headquarters and home at Clearfield, Pa. The operations he will manage include 250 miles of transmission lines, six power plants with a 30,000 kilowatt capacity, fully five times that used in the territory he is now managing, operations in thirty municipalities and in 140 coal mines, together with several steam-heating plants, a gas plant and the electric railway running from Indiana, Pa., to Phillipsburg.

SIDNEY PACKARD, assistant engineer of the Westfield (Mass.) Gas & Electric Light Works, will assume the duties of engineer for the present, which vacancy is caused by the resignation of James F. Treat.

CHARLES H. WINGATE, for three years the manager of the Fairmount branch of the Central Indiana Gas Company, is now located at Jenks, Okla., where he is manager of the plant of the Monarch Gasoline Company. Mr. Wingate left Fairmount about three months ago.

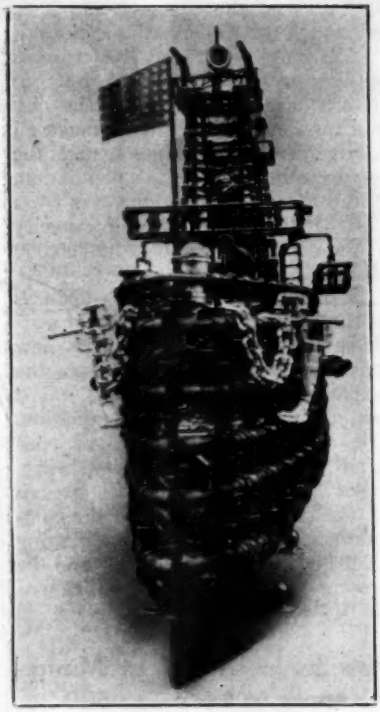
6,669 Pieces Enter Into Construction of Battleship Made from Fittings, Valves, etc.

The accompanying photographs give two views of a model of the superdreadnaught "New York," made completely of Crane Company products—fittings, valves, specialties, etc.

The model was designed and its construction supervised by an employee of Crane Company in the works of the company's Bridgeport Division. It was transported from Bridgeport to New York in a large motor truck, and now is on exhibition in the Crane exhibit rooms, 23 West Forty-fourth Street, New York.

The over-all dimensions of the model are: Length, 186 in.; breadth, 34 in.; molded depth, 42 in.; total height from keel to topmast, 102 in. Its net weight is 3,308 lb.

Six thousand six hundred and sixty-nine separate parts enter into the construction of this model. It is complete to the smallest detail, and the ordinary working parts of a battleship are movable. A small electric motor gives action to the propeller. The ship is electrically wired throughout, the wires running in



SHIP COMPLETE TO SMALLEST DETAIL

conduit, and by the pressing of a button action may be seen everywhere—the propeller turns, the commander salutes, lights flash, guns roar, the wireless crackles, the searchlight throws a searching beam. The entire action is automatic and may be repeated indefinitely, or until the pressing of another button stops it.

A row of colored electric lights run from the bow to stern over the mast tops, and when in action the model makes a truly interesting exhibition.

Construction Notes

Indianapolis Company Requests Suspension of Main Extension Requirements

Mayor Charles W. Jewett of Indianapolis has just made public a communication which he has received from the Citizens Gas Company in which it is pointed out that "every public and private consideration at this time warrants the complete suspension of gas main extensions." No action has yet been announced on the communication either by the Mayor or the Indianapolis Board of Public Works.

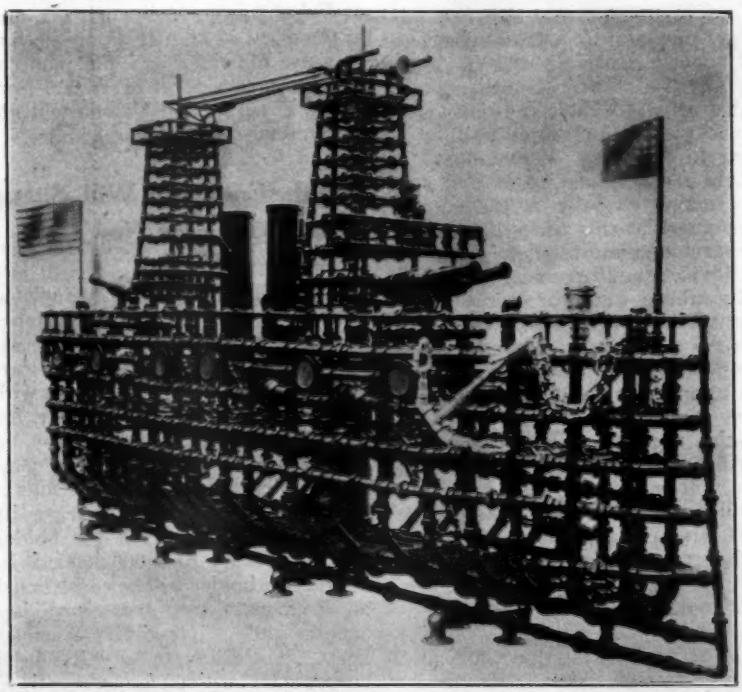
J. D. Forrest, secretary and general manager of the gas company, in the communication sets forth that although the franchise requirements for extensions in Indianapolis by the gas company, which also operates the property of the Indianapolis Gas Company, by lease, amount to 35,840 ft. per year, the average extensions made by the company on orders of the board of public works during the last four years have amounted to 51,053 ft. a year.

In giving its reasons for the wartime request the company's letter says:

"Although it is the desire of the Citizens Gas Company to do its full share in the development of Indianapolis, and especially to cooperate in every reasonable way with the constituted officials of the city, we believe that every public and private consideration at this time warrants the complete suspension of gas main extensions, and we respectfully submit the following reasons for such suspensions:

"1. It will probably be physically impossible for the company to secure the material and labor required for gas main extensions upon any considerable scale. During the year 1917 work of this character was carried on with extreme difficulty. Altogether apart from the greatly increased cost, the reduced supply of labor and the withdrawal of iron and steel products for war purposes make it improbable that any considerable extensions can be made during the year 1918.

"2. It is also doubtful whether the company will be able to finance such extensions at this time. Although the company had a considerable cash surplus a year ago, this has been very greatly reduced by the absorption of current funds in numerous betterments, while the increased cost of almost all supplies used by the company, especially including its coal, ties up a great deal more of working capital. It is not likely that securities of the company could be sold this year at any price which the public service commission would approve, even if the Federal authori-



LENGTH OF MODEL, 186 IN.; BREADTH, 34 IN.; MOLDED DEPTH, 42 IN.; HEIGHT FROM KEEL TO TOPMAST, 102 IN.; WEIGHT, 3,308 LB.

ties do not interfere with financing of such improvements as local gas main extensions.

"3. Added to the difficulty in securing supplies and labor and that of financing improvements is the increased cost of all improvements at this time. Gas mains laid during the year 1917 represented an increase of more than 100 per cent over the cost of the year preceding. The cost in 1918 will doubtless be considerably higher. We do not believe that it is good public policy to require public utilities to put improvements into their capital account at this time unless it is absolutely impossible to postpone such improvements. Such increased capital charges add to burdens of the public utilities, and these are already so much greater than those of normal times that most of them are obliged to ask for increased rates. No unnecessary burden in the way of capital charges should be added at this time.

"4. The greatly increased cost and scarcity of coal and oil have thrown upon the gas company a demand for gas which it is impossible to meet. Our service has been crippled by the overdemands which have been made upon it. It is impossible at this time to enlarge our plants. Therefore our producing capacity will have to remain at a standstill until normal times return. Since it is impossible to give an unlimited supply of gas to existing consumers, it would seem unwise to extend any gas mains or take on additional consumers at this time. The public service commission has strongly advised against increasing our obligations, and for some time past we have been referring applicants for new service to the commission, which in most cases does not approve the additional connections. Any considerable addition to the number of consumers on our lines during the coming season will make our service to the public very much less satisfactory next winter than it now is, and we feel very greatly chagrined that we are not able to render better service at this time. Our plants are entirely adequate for the normal gas demand at this time, and for a normal increase in the same for several years to come, but no gas plants which could possibly be built by this company would enable it to supply the amount of gas which the consumers have tried to take this winter.

"For these reasons we respectfully request a suspension of gas main extensions at this time. In making this request we not only point to our record of extensions during the last four years, but we pledge ourselves to exceed franchise requirements in future normal years to an extent that will fully make up for the omission of extensions during the year 1918. We therefore trust that you will be able to avoid making street improvements which would render main extensions desirable, and that you may also be able to show petitioners for gas main extensions that orders at this time would be contrary to the war interests of the Nation and to the best interests of the city."

Contra Costa Company to Extend Its Pressure System

Property near the center of Martinez, Cal., on which a gas pressure tank will be erected to guarantee a steady gas pressure at all times, was purchased recently by the Contra Costa Gas Company. The pressure station is to be erected at the corner of Estudillo and Mellus Streets, and in the event of trouble along the line between Martinez and the plant at Pittsburg, service in Martinez, Port Costa, Crockett and Valona will not be interrupted for several hours.

Zenith Company Will Spend $135,000 for New Gas Holder

With the foundation completed and plans for work in the upper structure ready as soon as the necessary materials arrive, the Zenith Furnace Company took out a permit with City Building Inspector Kielley for building operations, calling for an expenditure of $135,000. The company, which furnishes gas to Duluth, contracted last fall to increase its facilities and to erect a gas holder with a capacity of 1,000,000 cu. ft.

The new holder will be constructed on Fremont Street, between Fifty-eighth and Fifty-ninth Avenues West. The concrete base has been under construction for some time, and only the delay in the arrival of the steel parts for the huge tanks hinders the work. Advices, however, are to the effect that they are on the way, the parts having been shipped from Cincinnati, Ohio.

The building of this structure is made necessary because of the contract executed last fall by the city and the Zenith company to make all enlargements or additions to meet the requirements of the city's population. The contract runs for ten years from Oct. 8, 1917. The present capacity of the company is said to be 500,000 cu. ft.

Another clause in the contract was to the effect that the city could purchase the plant, including the new tank at any time, paying therefor the actual cost to the company, less 3 per cent each year for depreciation. The addition of the new gas container will triple the capacity, bringing it up to 1,500,000 cu. ft., enough to take care of the needs of the community. Duluth is at present using 1,000,000 cu. ft. of gas daily, and the present tanks are said to be incapable of furnishing that amount.

New Boiler House at Minneapolis to Cost $15,500

The Minneapolis (Minn.) Gas Light Company recently took out a permit for its new toluol plant at Bluff Street, between Cedar and Nineteenth Avenues, South, to cost $15,500. It is to be completed May 1, and will be built by day labor.

Operations of New Gas Plant at Fond du Lac Halted Pending Arrival of Steel Material

Owing to the fact that large shipments of steel consigned to the Eastern Wisconsin Railways & Light Company have been delayed in transit, the work of constructing the benches and retort house at the new gas plant has been retarded.

The material is expected to arrive any day, and the work will be rushed as soon as the steel reaches Fond du Lac, Wis. In the meantime the workmen are installing machinery and pipes.

Eureka, Company Increased Rates

The Eureka, Cal., division of the Western States Gas & Electric Company has been authorized by the Railroad Commission of California to place in effect substantial increases in rates for gas service.